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WATER PROJECT AUTHORITY
OF THE
STATE OF CALIFORNIA
GOODWIN J. KNIGHT, GOVERNOR

REPORT TO THE
CALIFORNIA STATE LEGISLATURE

PURSUANT TO

THE ABSHIRE-KELLY SALINITY CONTROL BARRIER ACT OF 1953
Chapter 1104, Statutes of 1953

ON

FEASIBILITY OF CONSTRUCTION
BY THE STATE

OF

BARRIERS IN THE
SAN FRANCISCO BAY SYSTEM



March 1955

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UNIVERSITY OF CALIFORNIA
INSTITUTE OF TRANSPORTATION
AND TRAFFIC ENGINEERING

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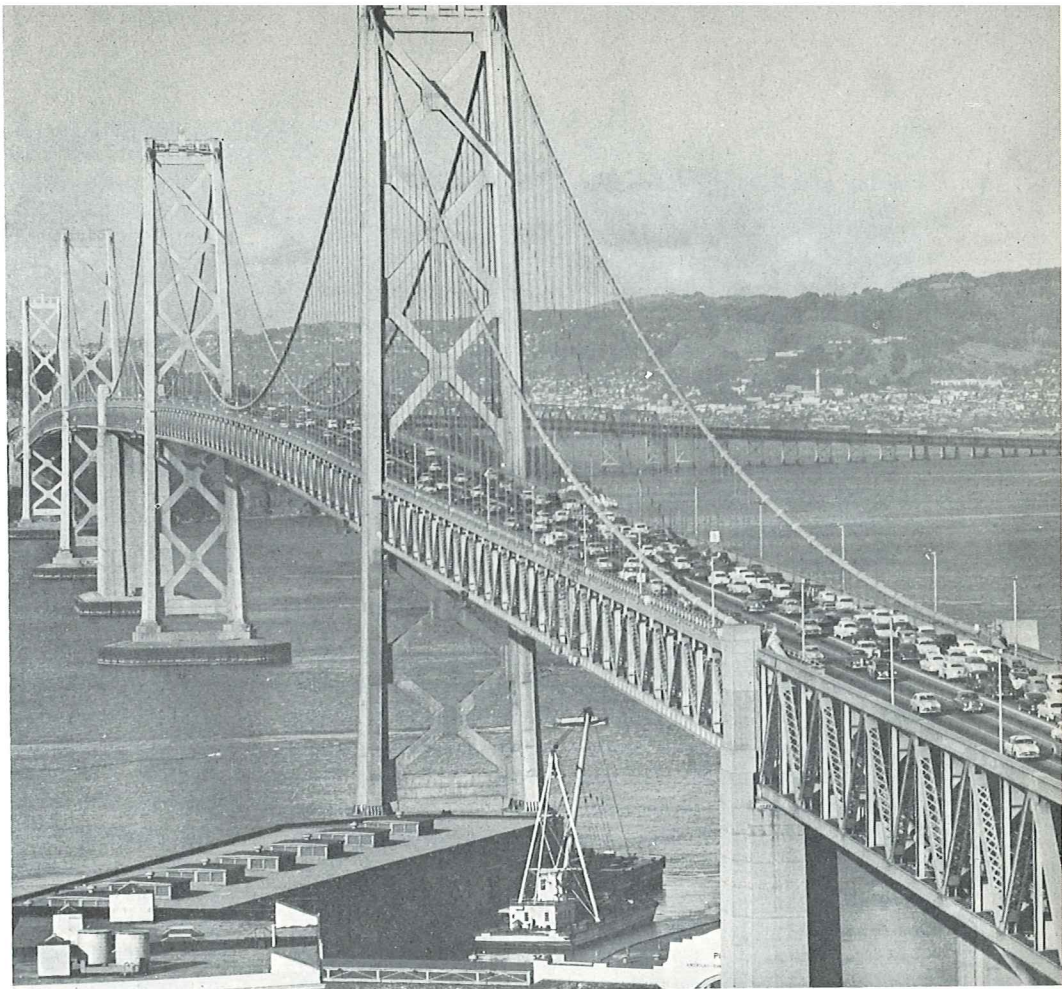
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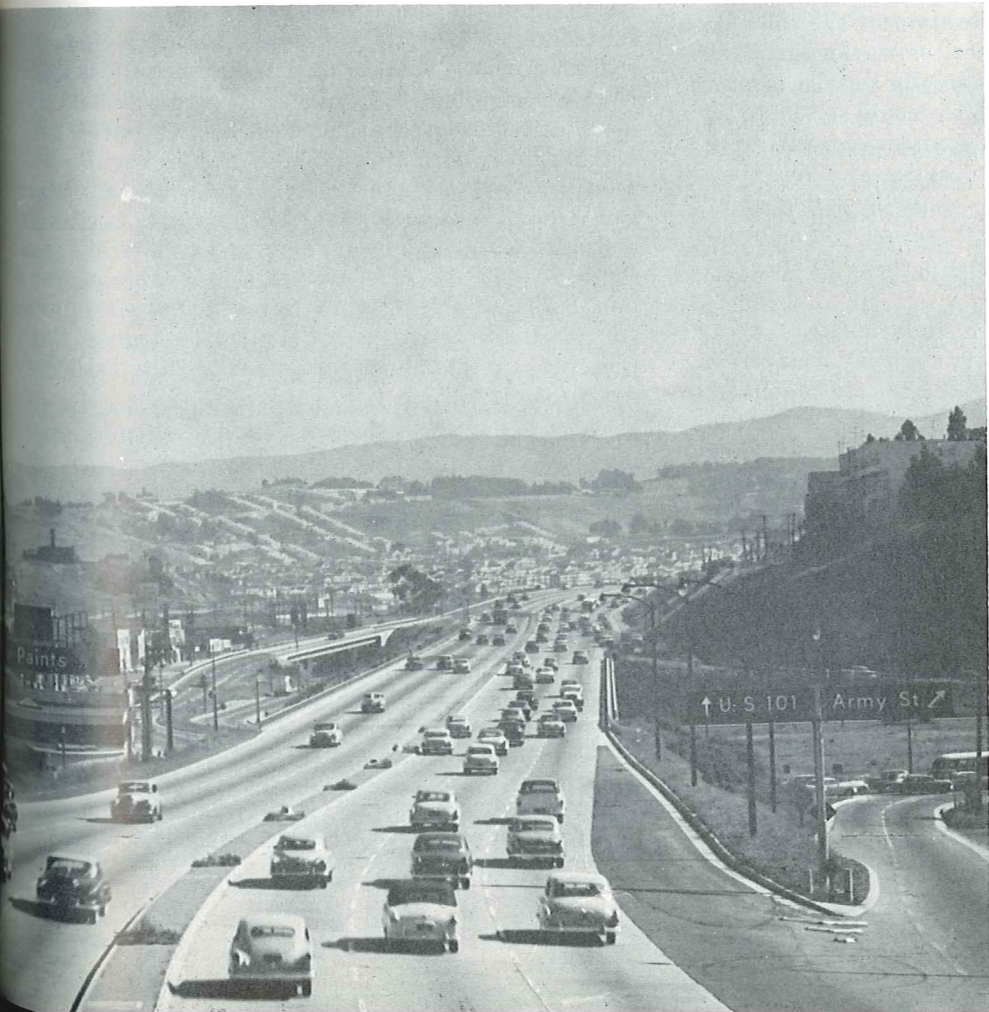
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Heavy Traffic on San Francisco-Oakland Bay Bridge

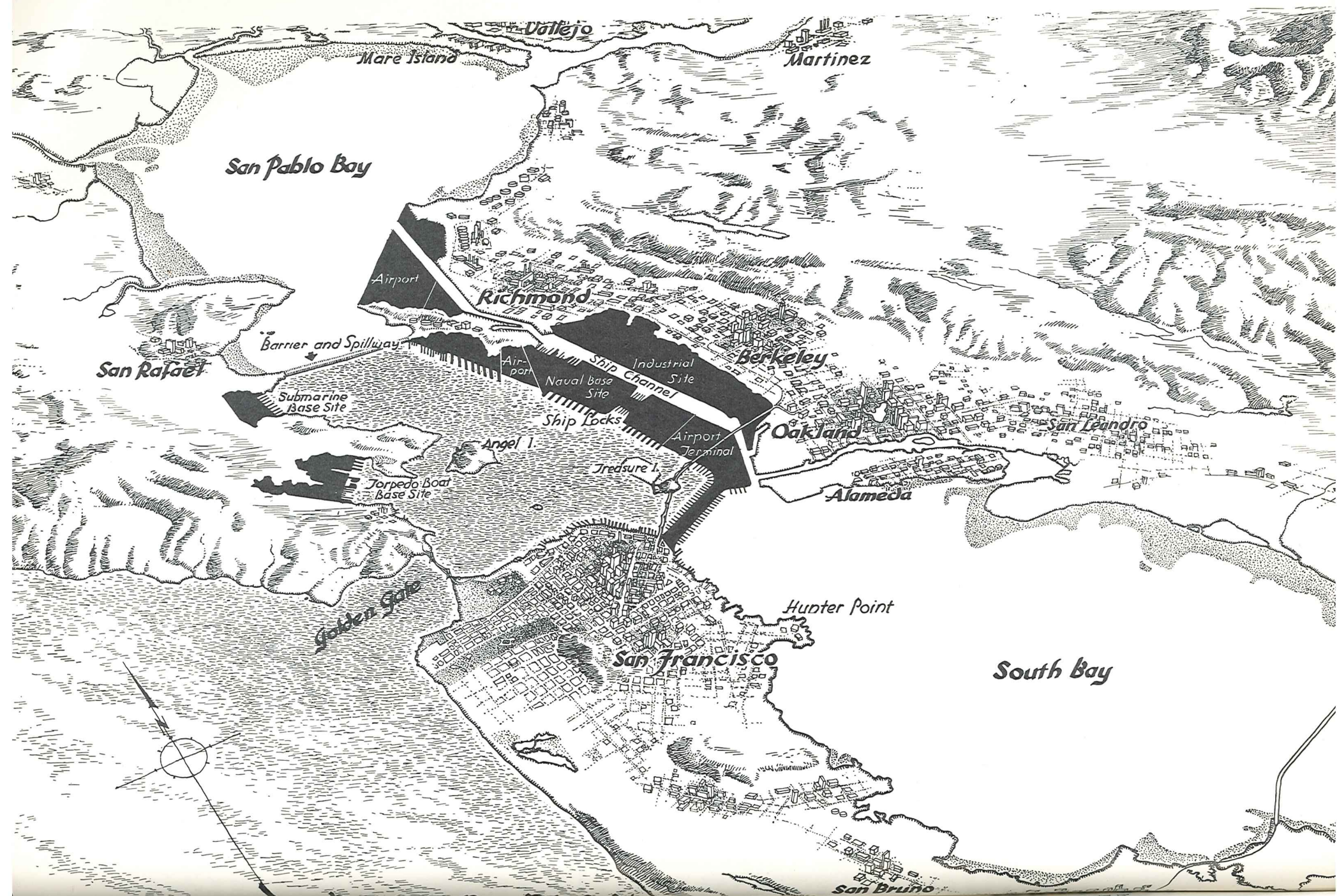


Division of Highways Photograph

Traffic on Freeway, U. S. 101 in San Francisco



Division of Highways Photograph



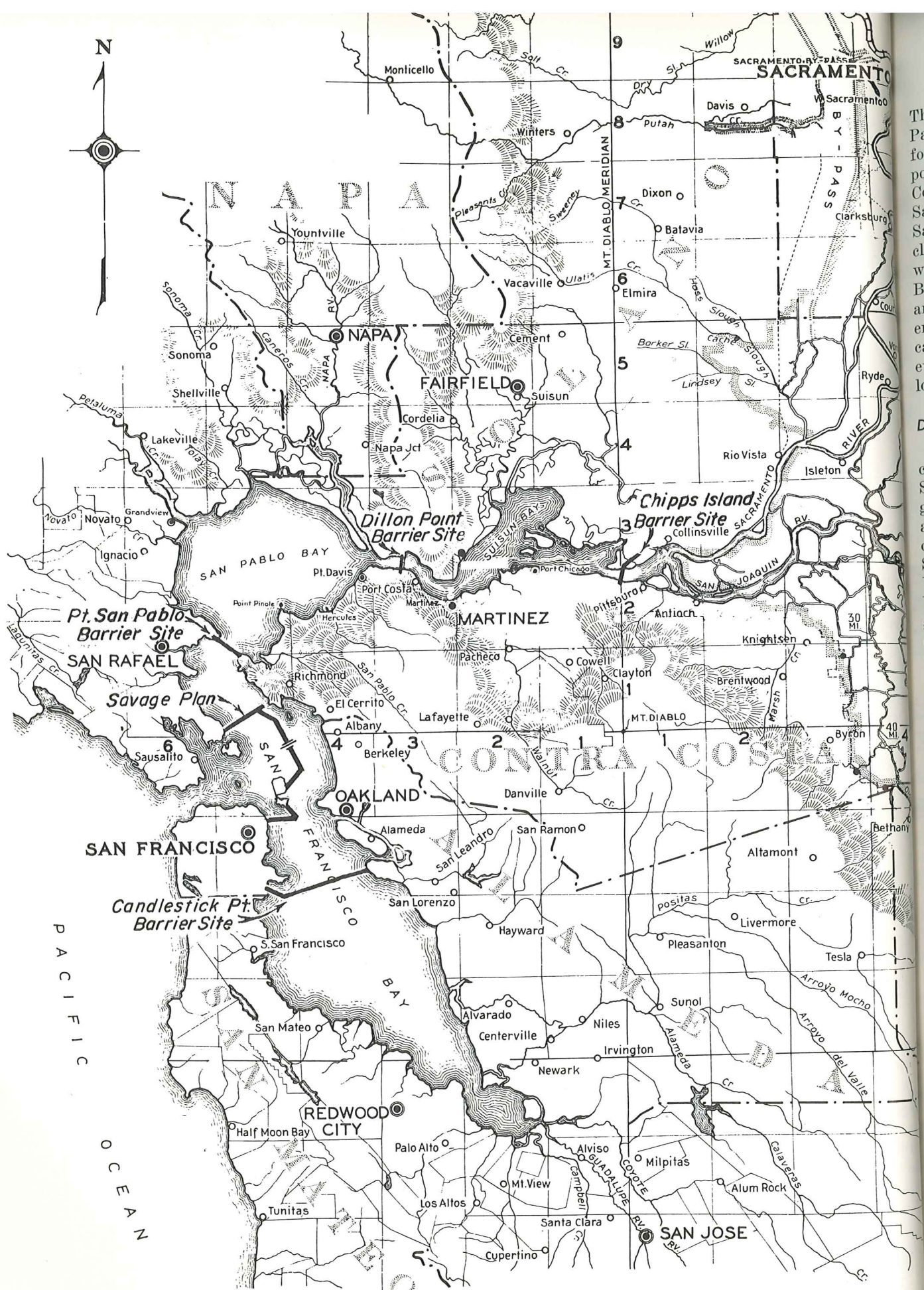
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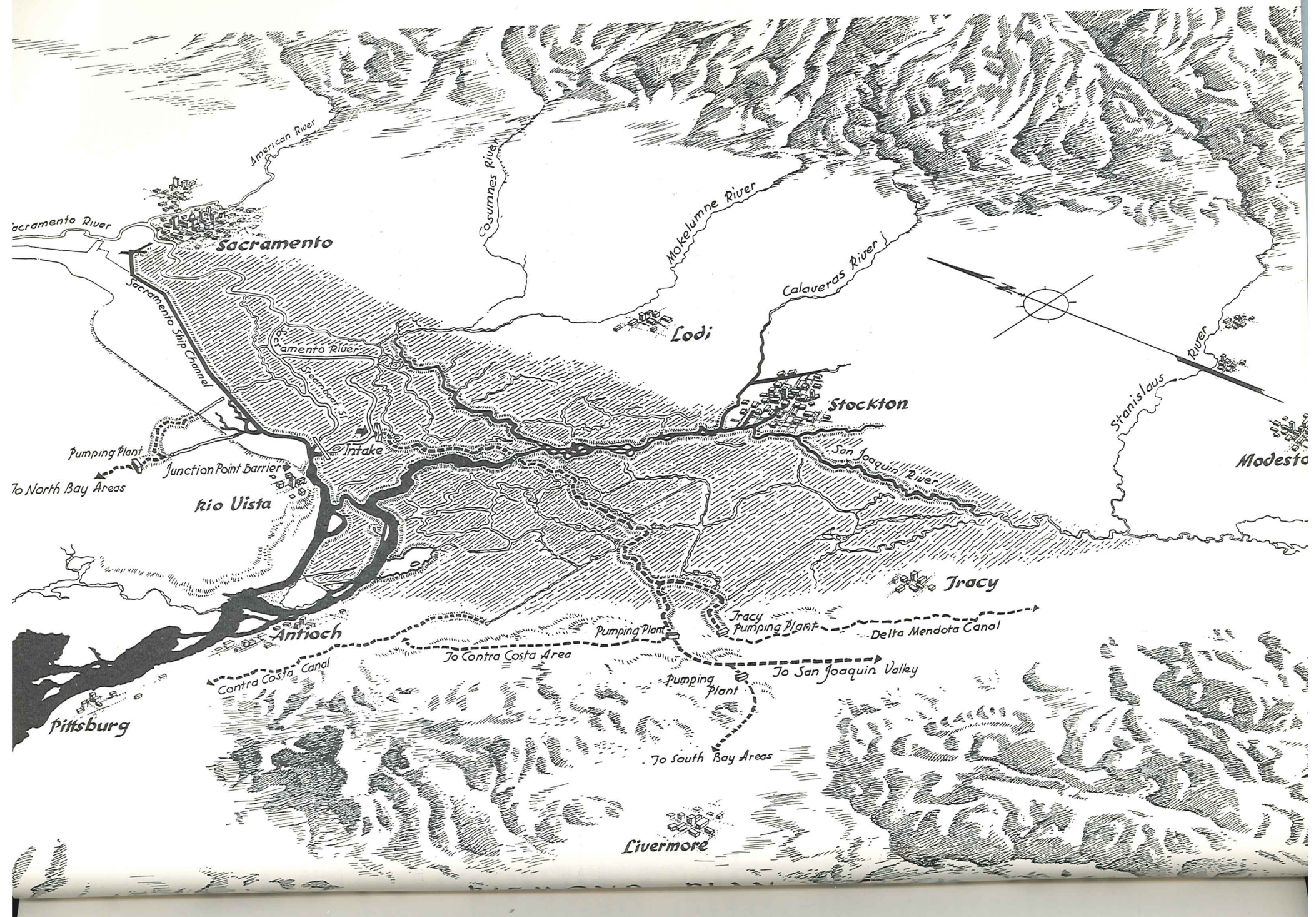
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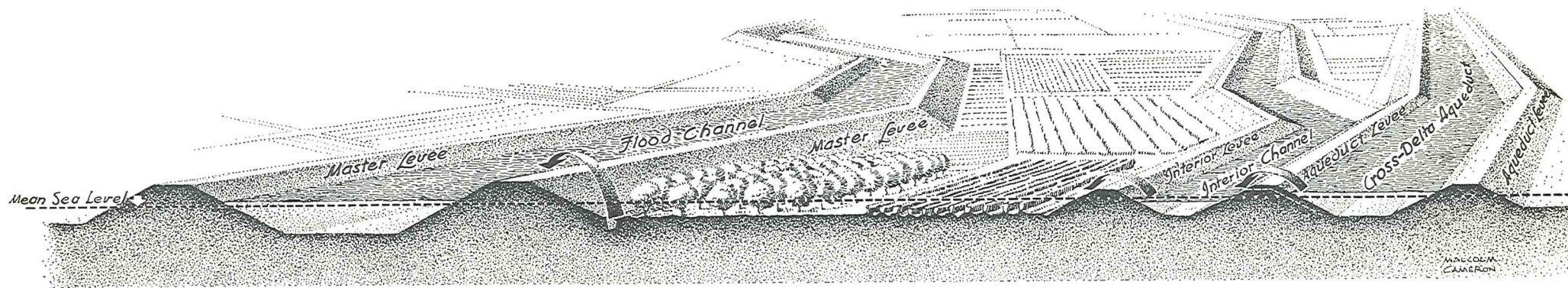
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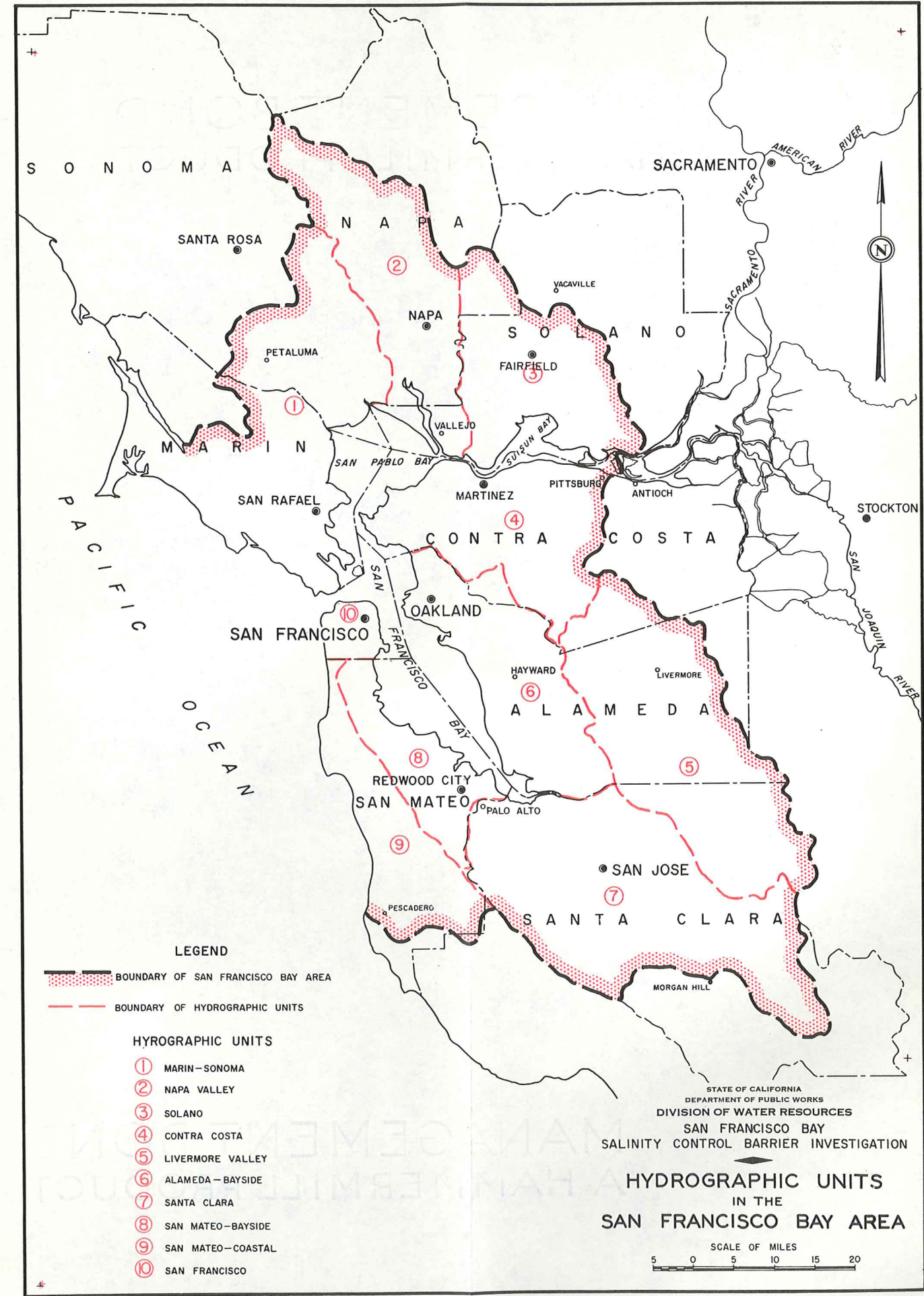
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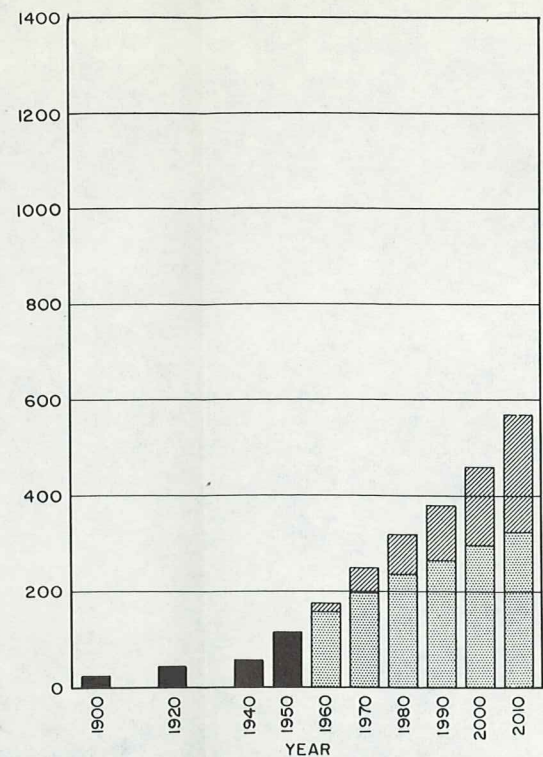
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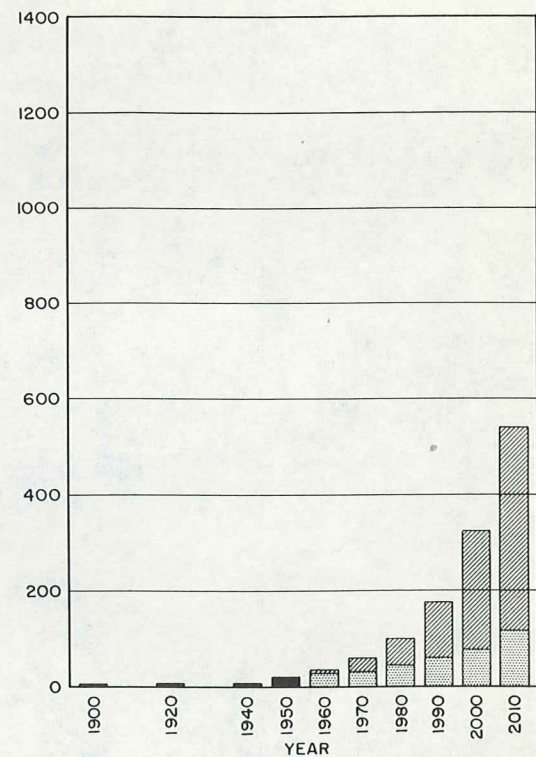


SCHEMATIC SECTION ACROSS DELTA
SHOWING
ELEMENTS OF BIEMOND PLAN

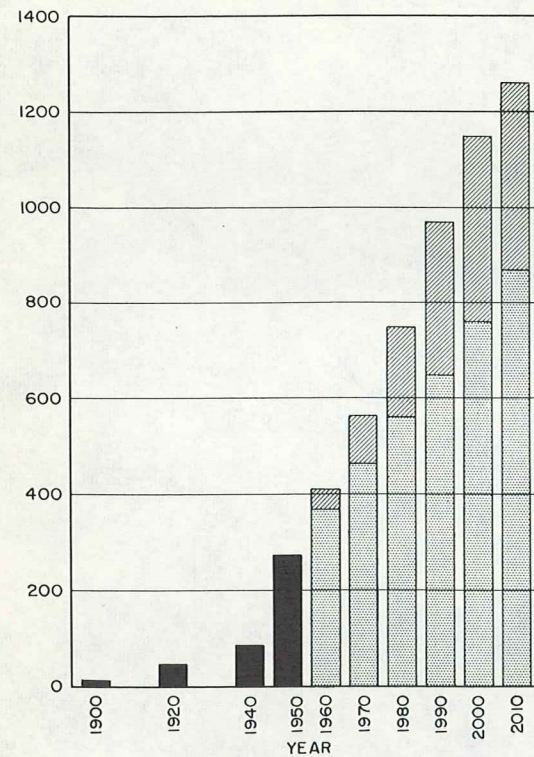




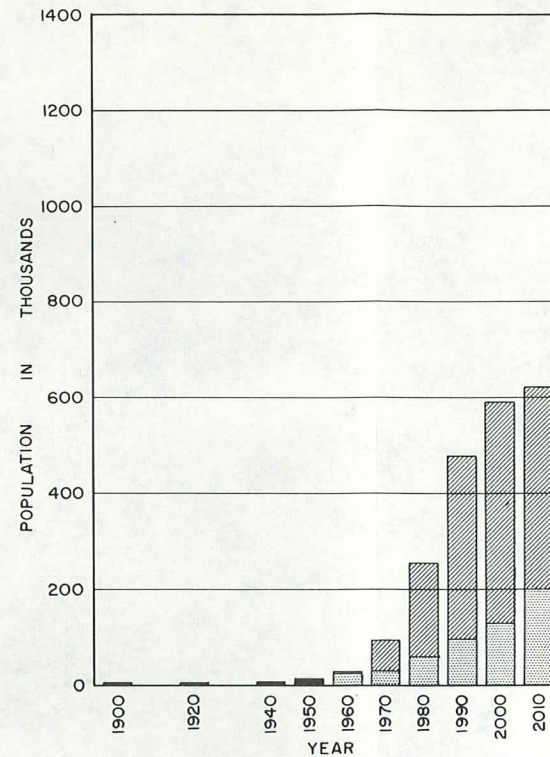
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NAPA VALLEY



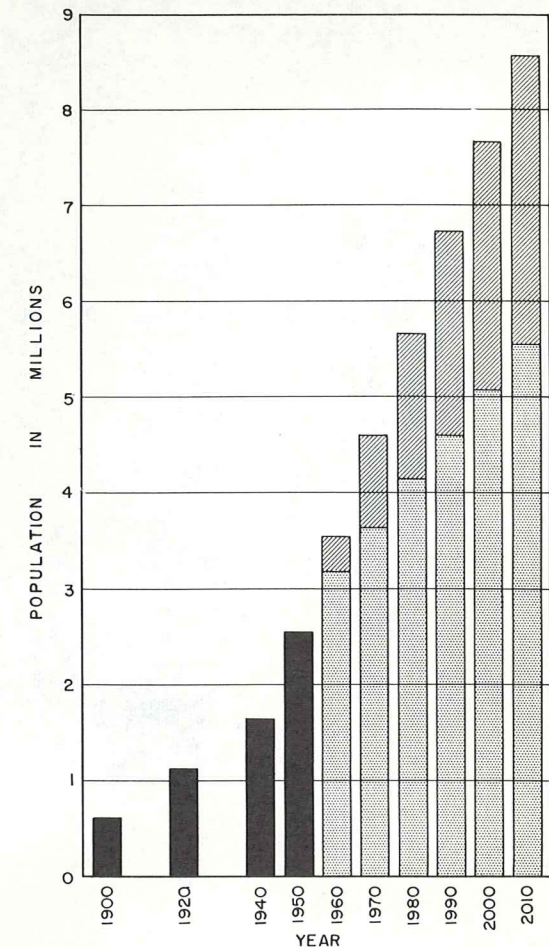
HYDROGRAPHIC UNIT 3
SOLANO



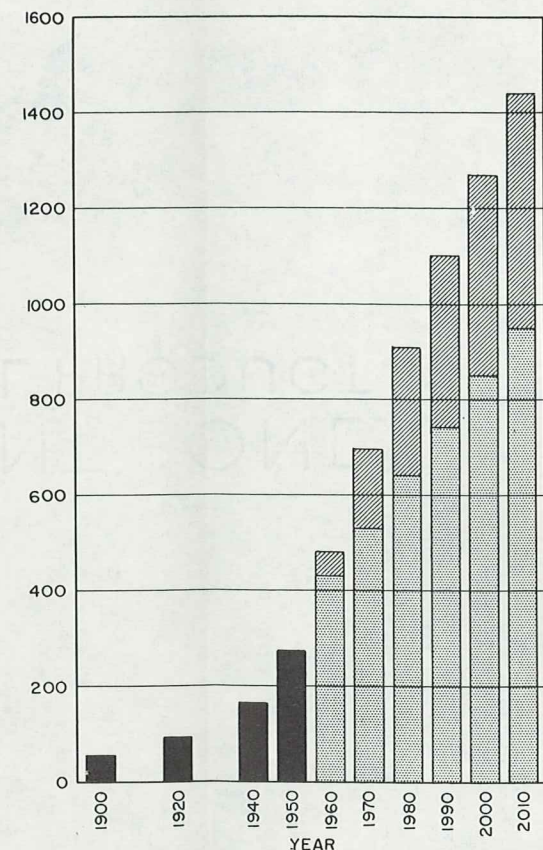
HYDROGRAPHIC UNIT 4
CONTRA COSTA



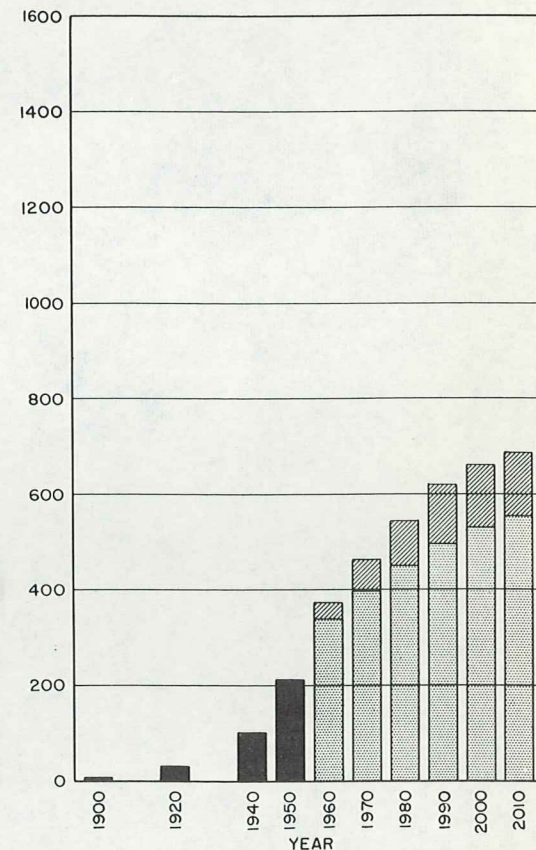
HYDROGRAPHIC UNIT 5
LIVERMORE VALLEY



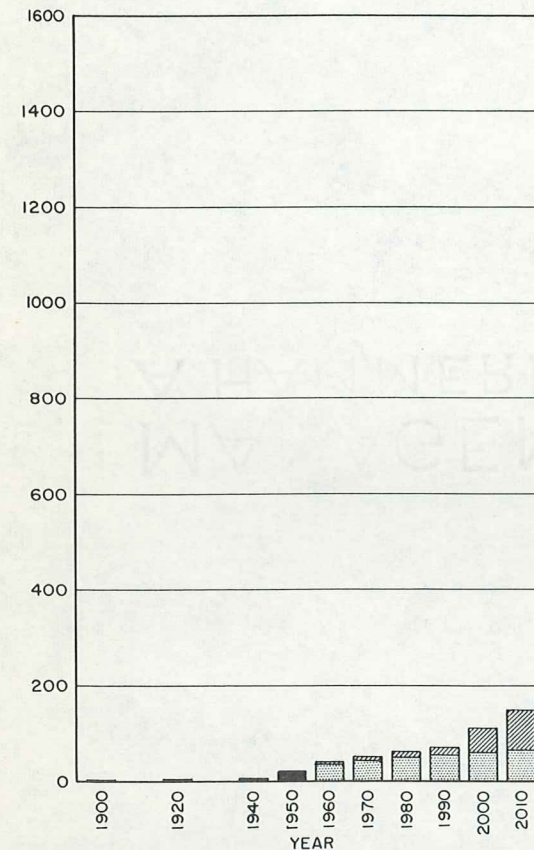
SAN FRANCISCO BAY AREA



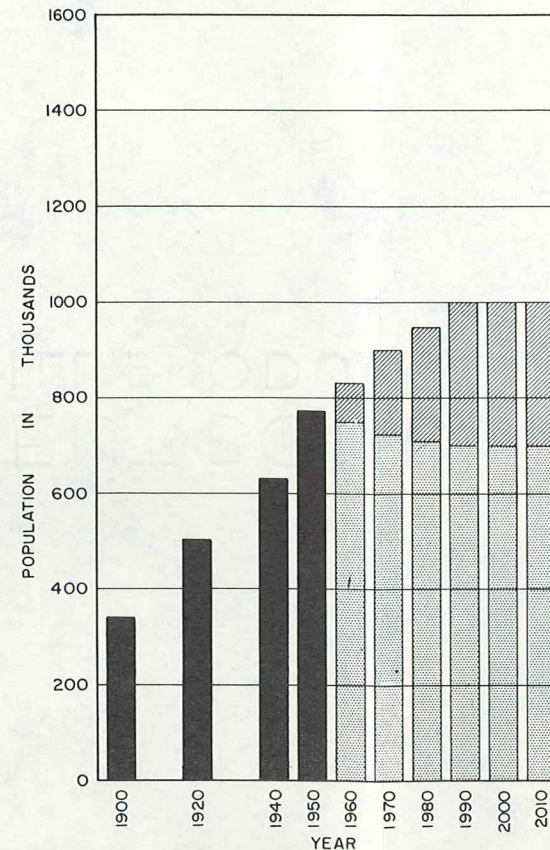
HYDROGRAPHIC UNIT 7
SANTA CLARA



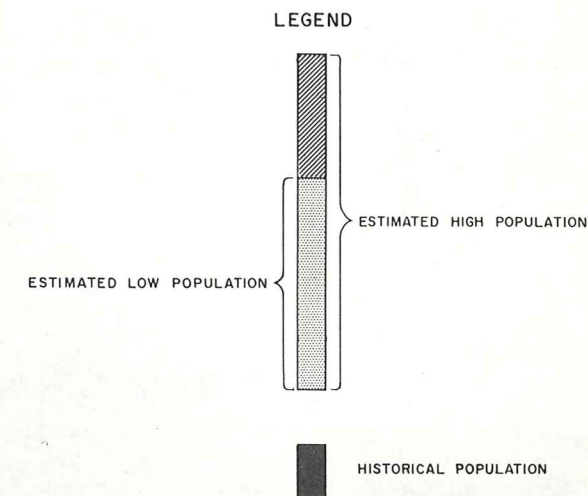
HYDROGRAPHIC UNIT 8
SAN MATEO-BAYSIDE



HYDROGRAPHIC UNIT 9
SAN MATEO-COASTAL

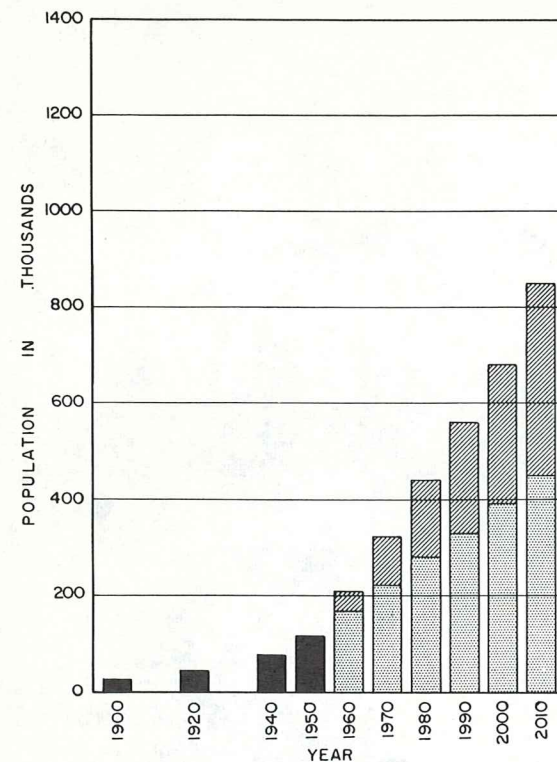


HYDROGRAPHIC UNIT 10
SAN FRANCISCO

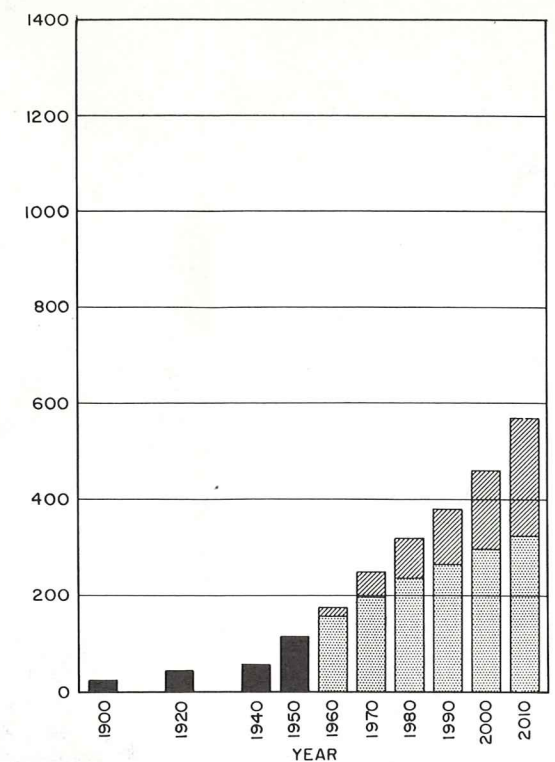


STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF WATER RESOURCES
SAN FRANCISCO BAY
SALINITY CONTROL BARRIER INVESTIGATION

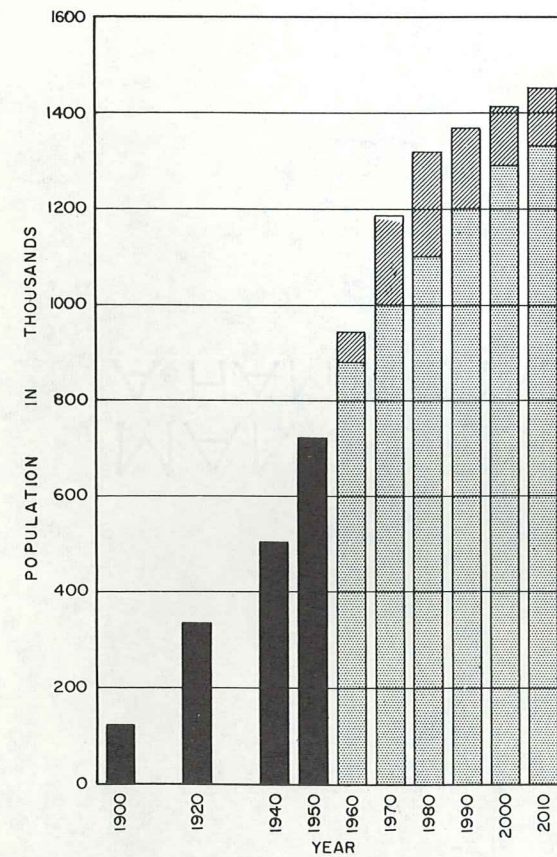
**HISTORICAL AND ESTIMATED
FUTURE POPULATION
OF THE
SAN FRANCISCO BAY AREA**



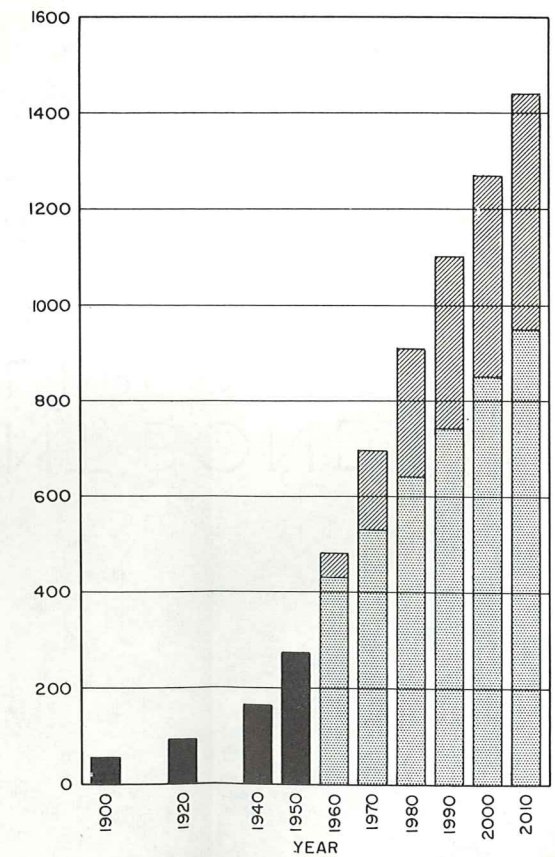
HYDROGRAPHIC UNIT 1
MARIN-SONOMA



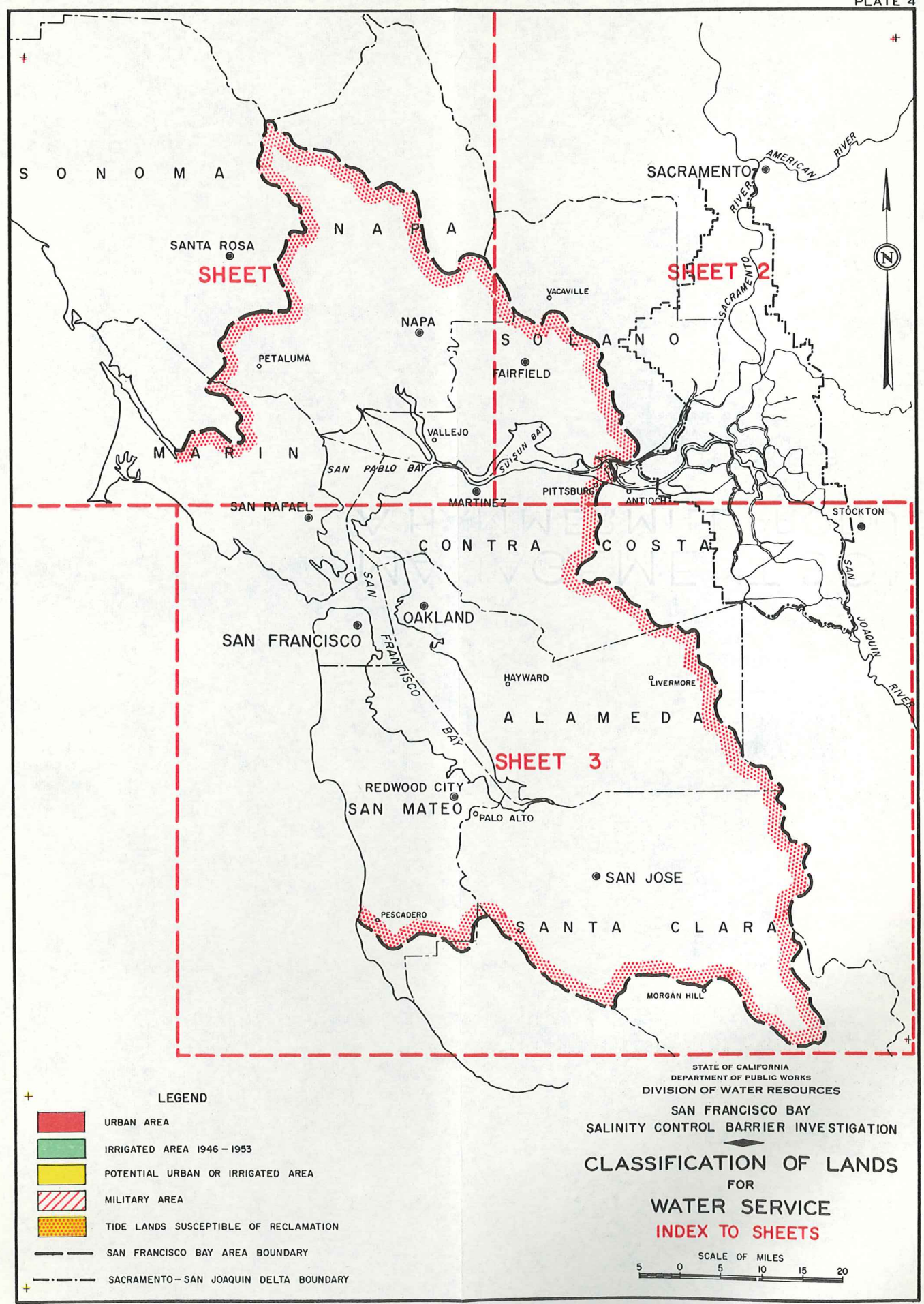
HYDROGRAPHIC UNIT 2
NAPA VALLEY

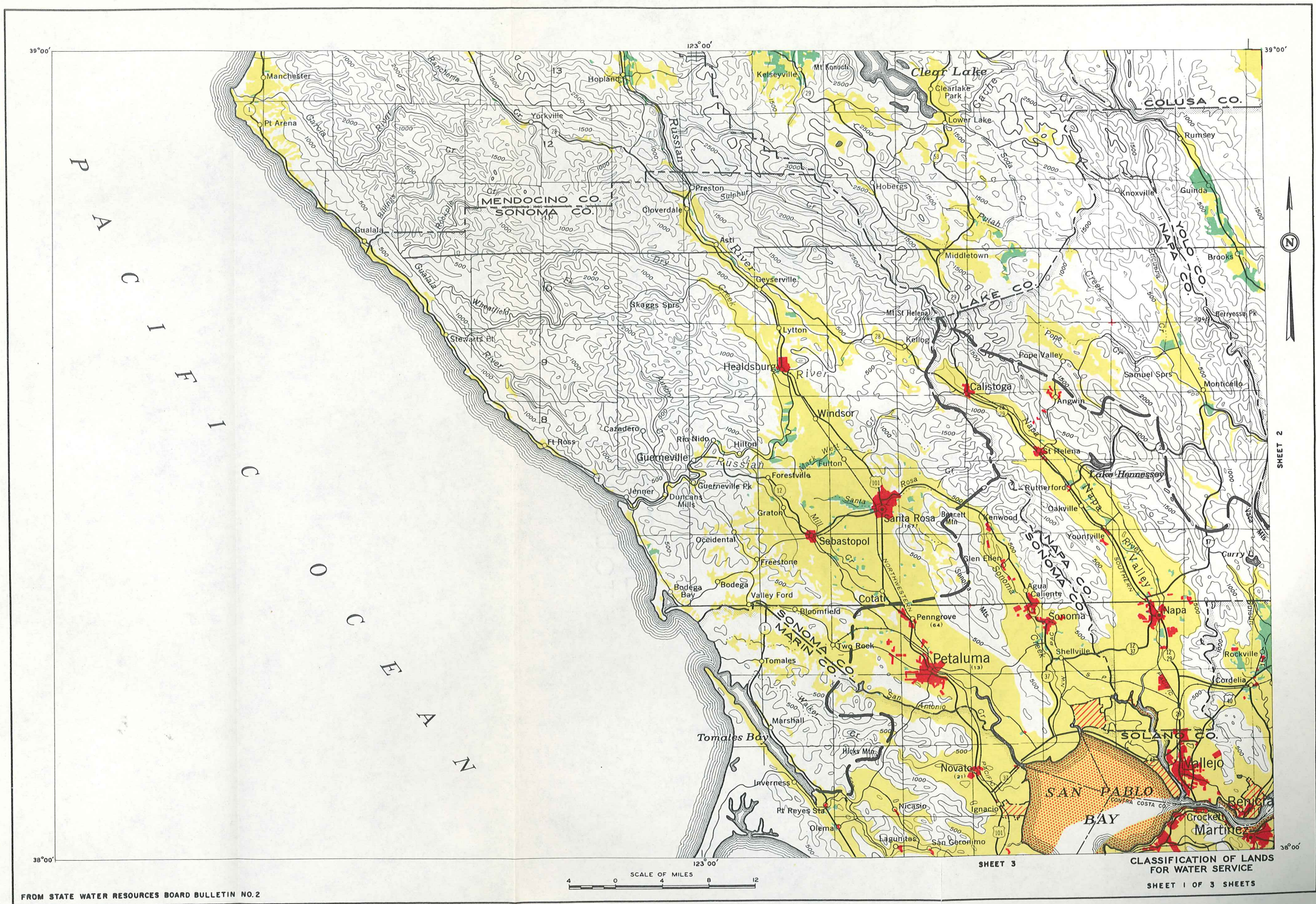


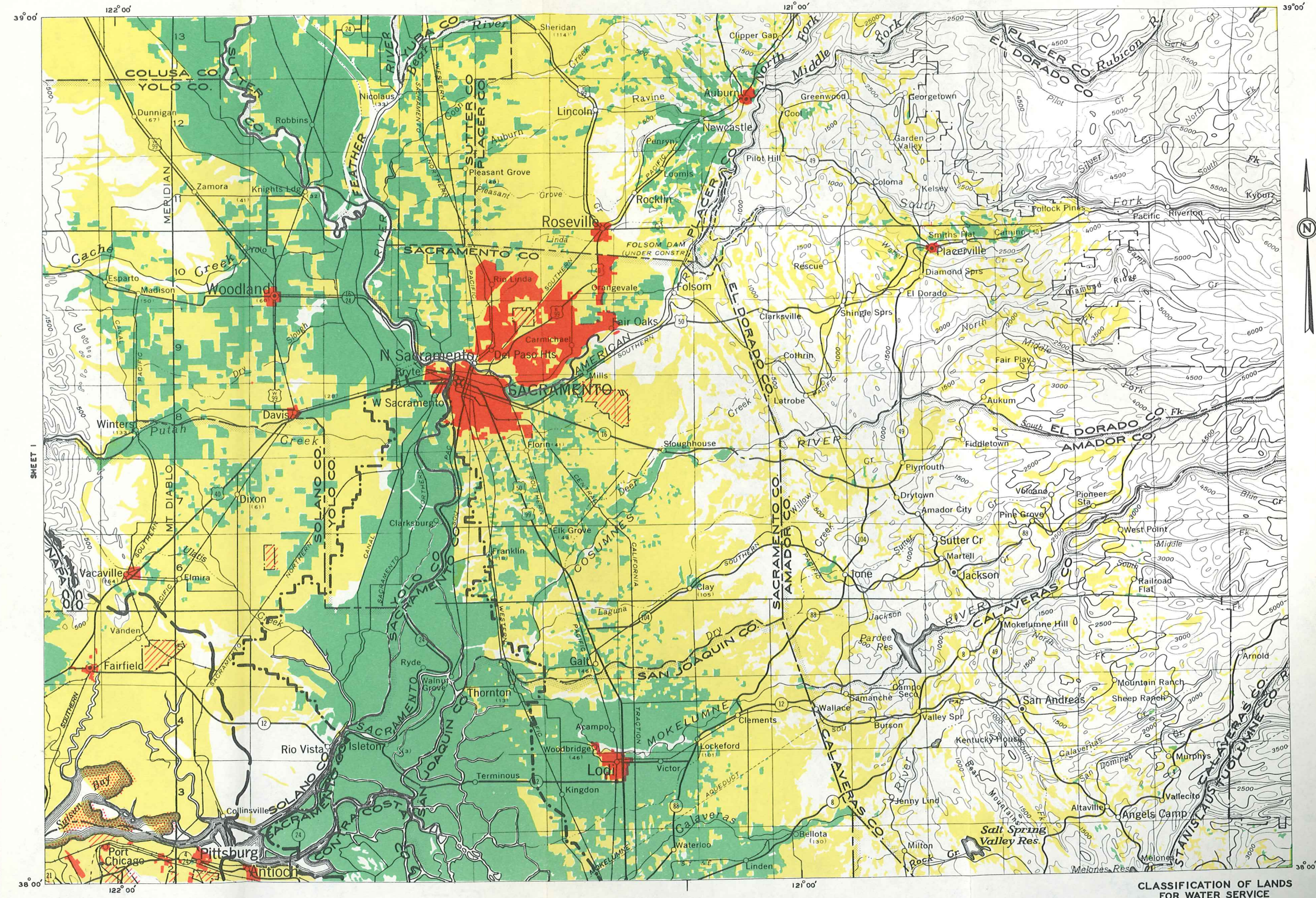
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ALAMEDA-BAYSIDE

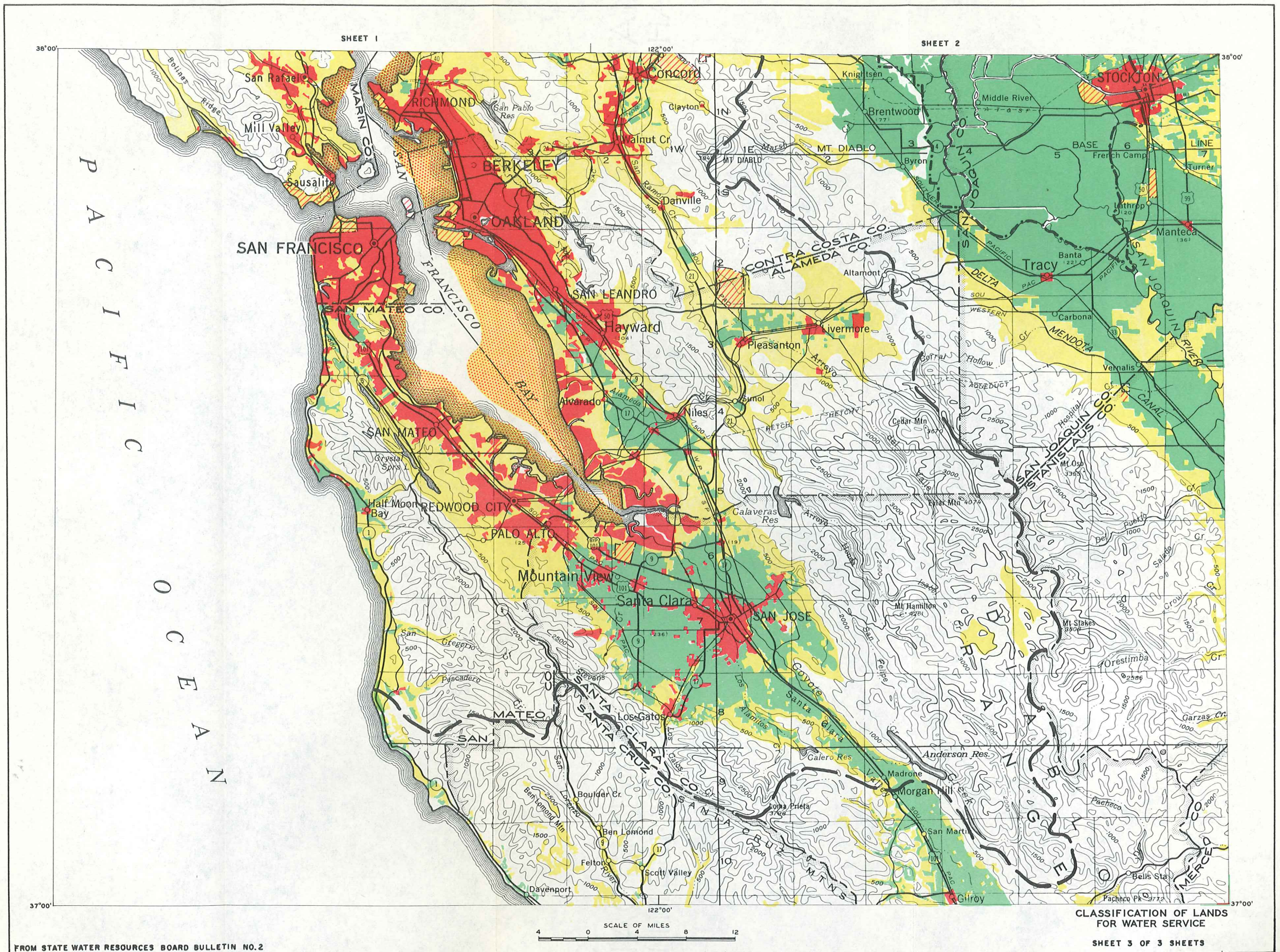


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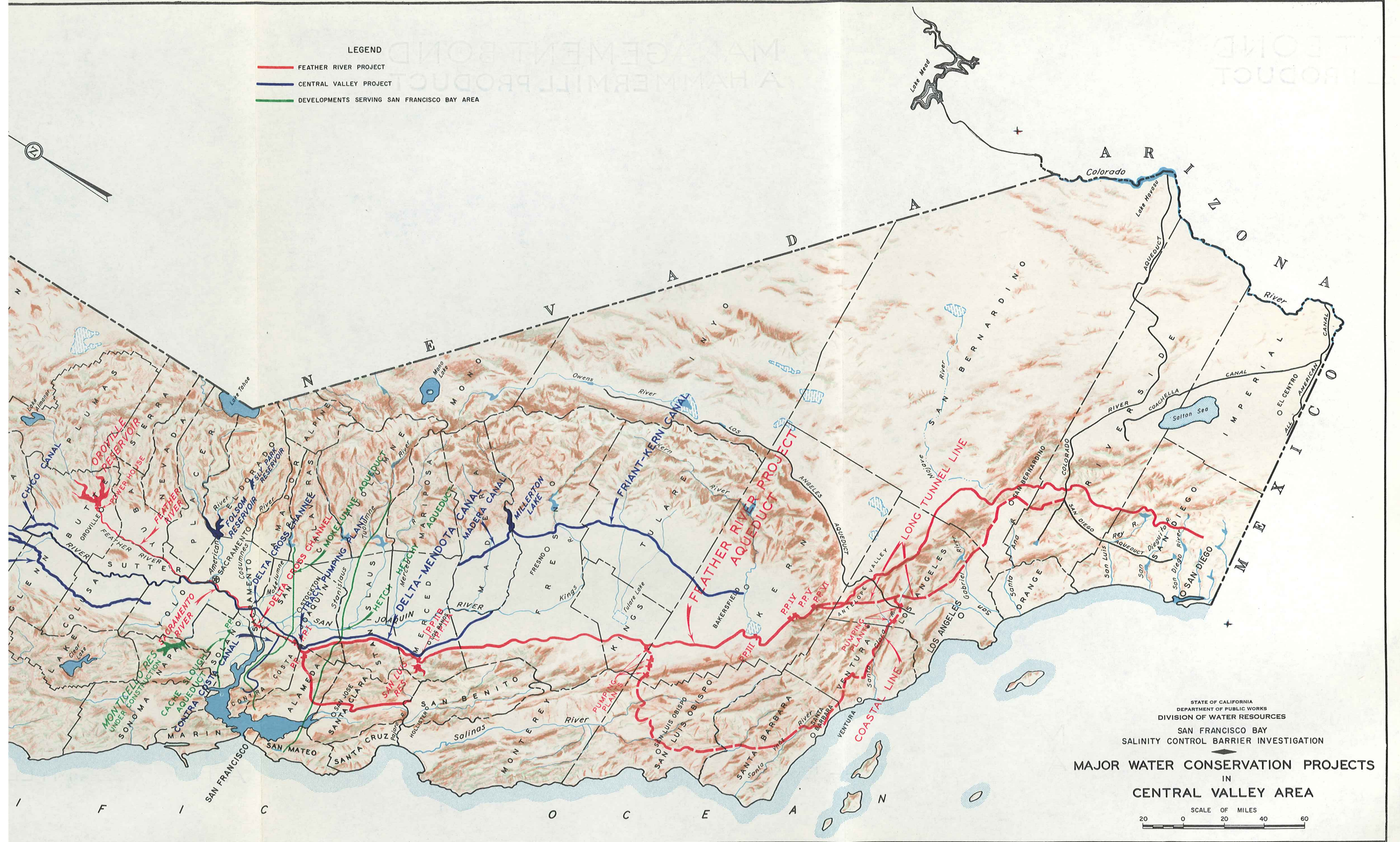






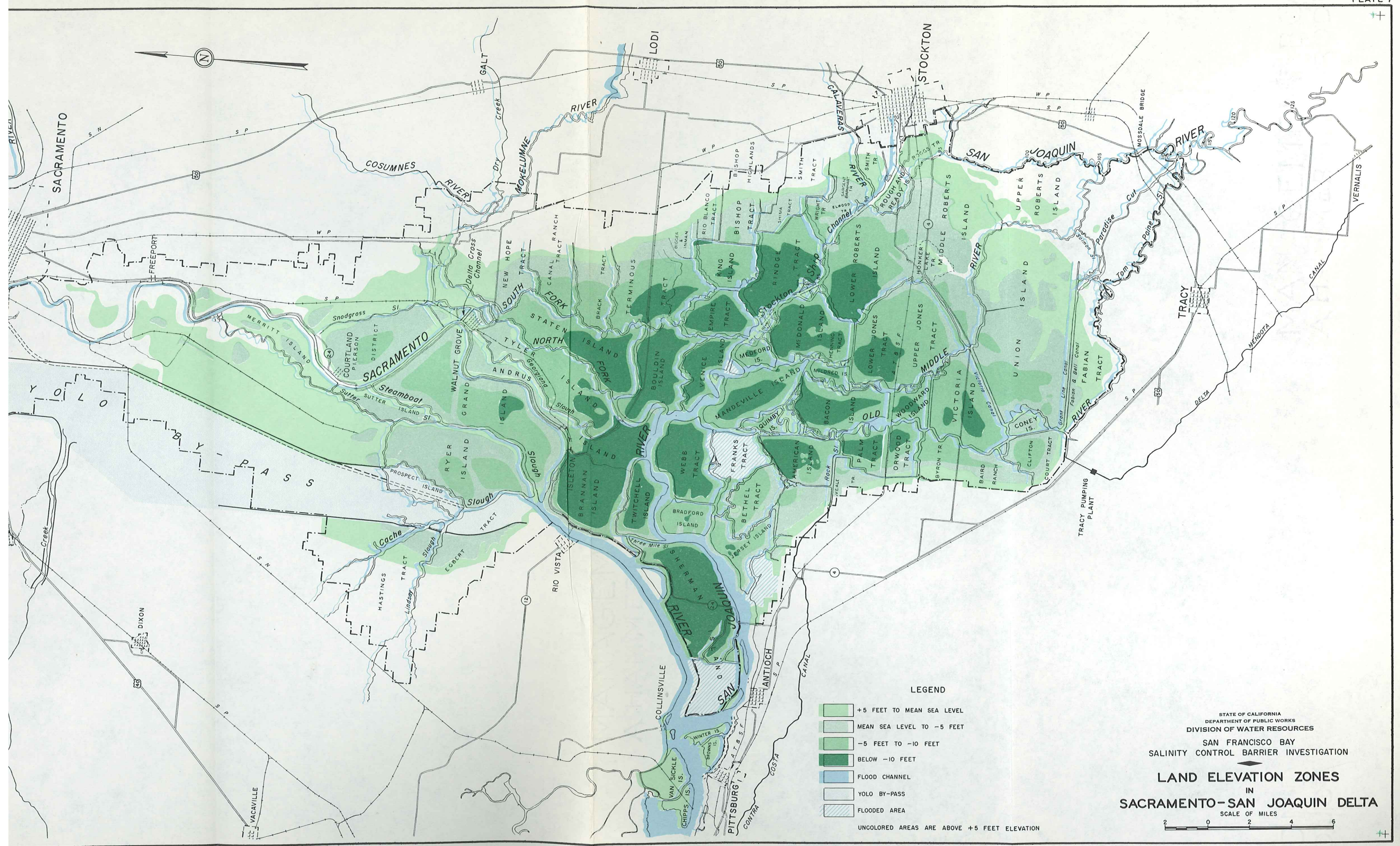
LEGEND

- FEATHER RIVER PROJECT
- CENTRAL VALLEY PROJECT
- DEVELOPMENTS SERVING SAN FRANCISCO BAY AREA



STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF WATER RESOURCES
SAN FRANCISCO BAY
SALINITY CONTROL BARRIER INVESTIGATION
MAJOR WATER CONSERVATION PROJECTS
IN
CENTRAL VALLEY AREA
SCALE OF MILES
20 0 20 40 60





LEGEND

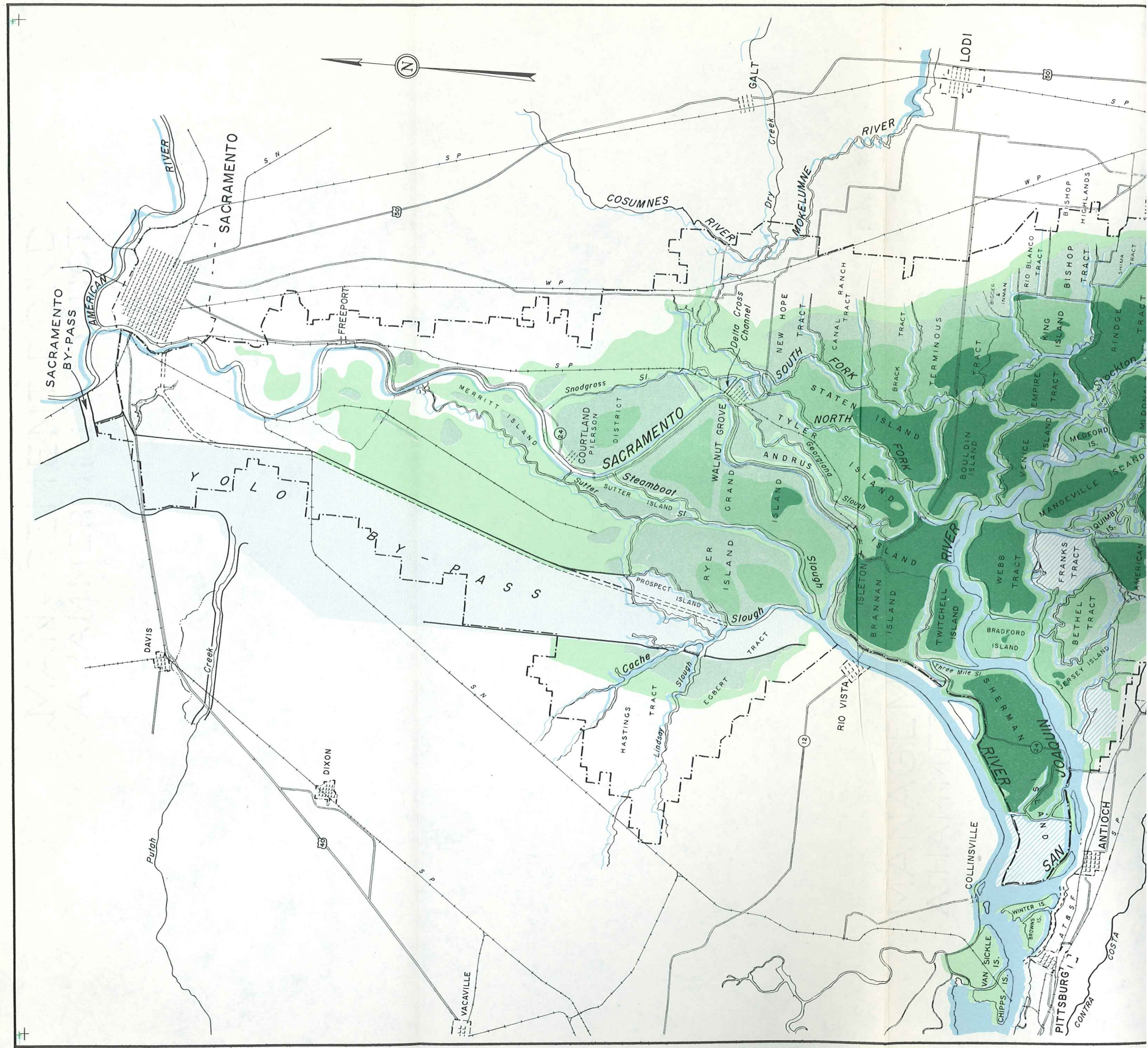
- +5 FEET TO MEAN SEA LEVEL
- MEAN SEA LEVEL TO -5 FEET
- 5 FEET TO -10 FEET
- BELOW -10 FEET
- FLOOD CHANNEL
- YOLO BY-PASS
- FLOODED AREA

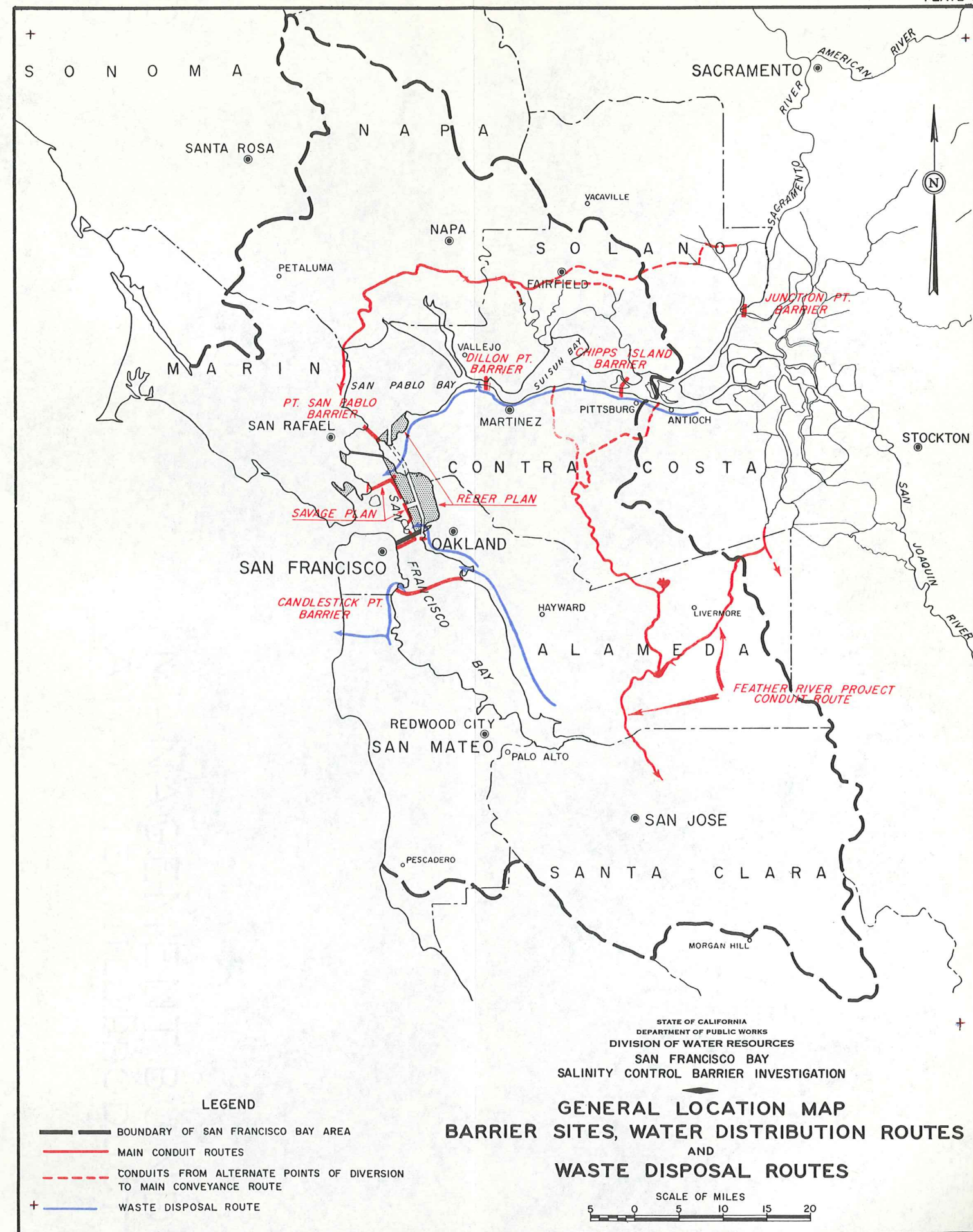
UNCOLORED AREAS ARE ABOVE +5 FEET ELEVATION

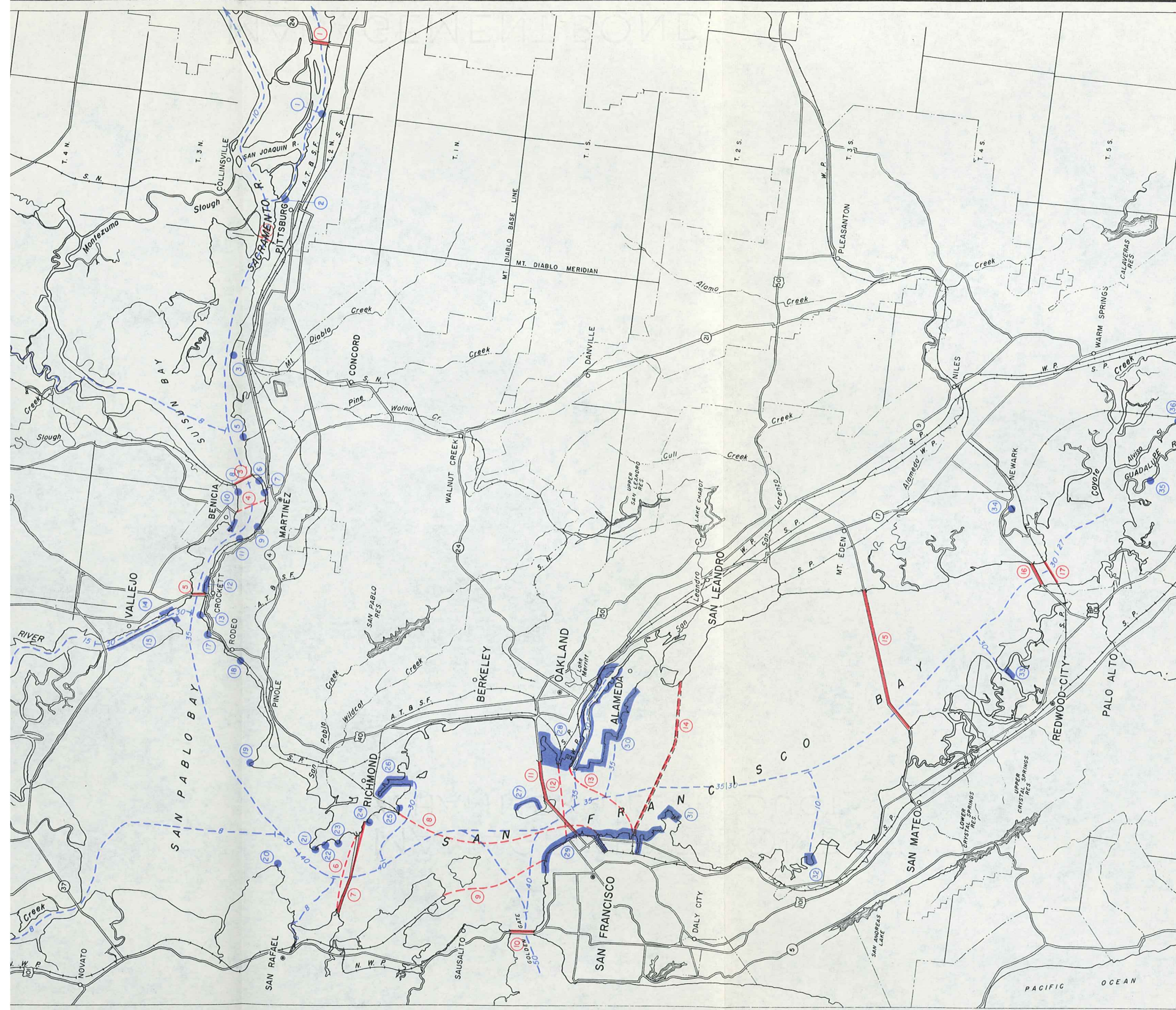
STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
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SAN FRANCISCO BAY
SALINITY CONTROL BARRIER INVESTIGATION

LAND ELEVATION ZONES
IN
SACRAMENTO-SAN JOAQUIN DELTA

SCALE OF MILES
2 0 2 4 6







LEGEND
TRANS-BAY CROSSINGS

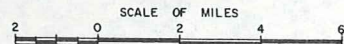
- | | |
|---|--|
| 1 ANTIOCH BRIDGE | 9 NORTHWESTERN PACIFIC FREIGHT FERRY |
| 2 SACRAMENTO NORTHERN FREIGHT FERRY (INACTIVE) | 10 GOLDEN GATE BRIDGE |
| 3 SOUTHERN PACIFIC BRIDGE | 11 SAN FRANCISCO-OAKLAND BAY BRIDGE |
| 4 BENICIA-MARTINEZ AUTO FERRY | 12 SOUTHERN PACIFIC PASSENGER FERRY |
| 5 CARQUINEZ BRIDGE | 13 WESTERN PACIFIC FREIGHT FERRY |
| 6 RICHMOND-SAN RAFAEL AUTO FERRY | 14 ARMY STREET-BAY FARM ISLAND BRIDGE (AUTHORIZED BUT NOT CONSTRUCTED) |
| 7 RICHMOND-SAN RAFAEL BRIDGE (UNDER CONSTRUCTION) | 15 SAN MATEO BRIDGE |
| 8 ATCHISON TOPEKA AND SANTA FE FREIGHT FERRY | 16 DUMBARTON BRIDGE |
| | 17 SOUTHERN PACIFIC BRIDGE |

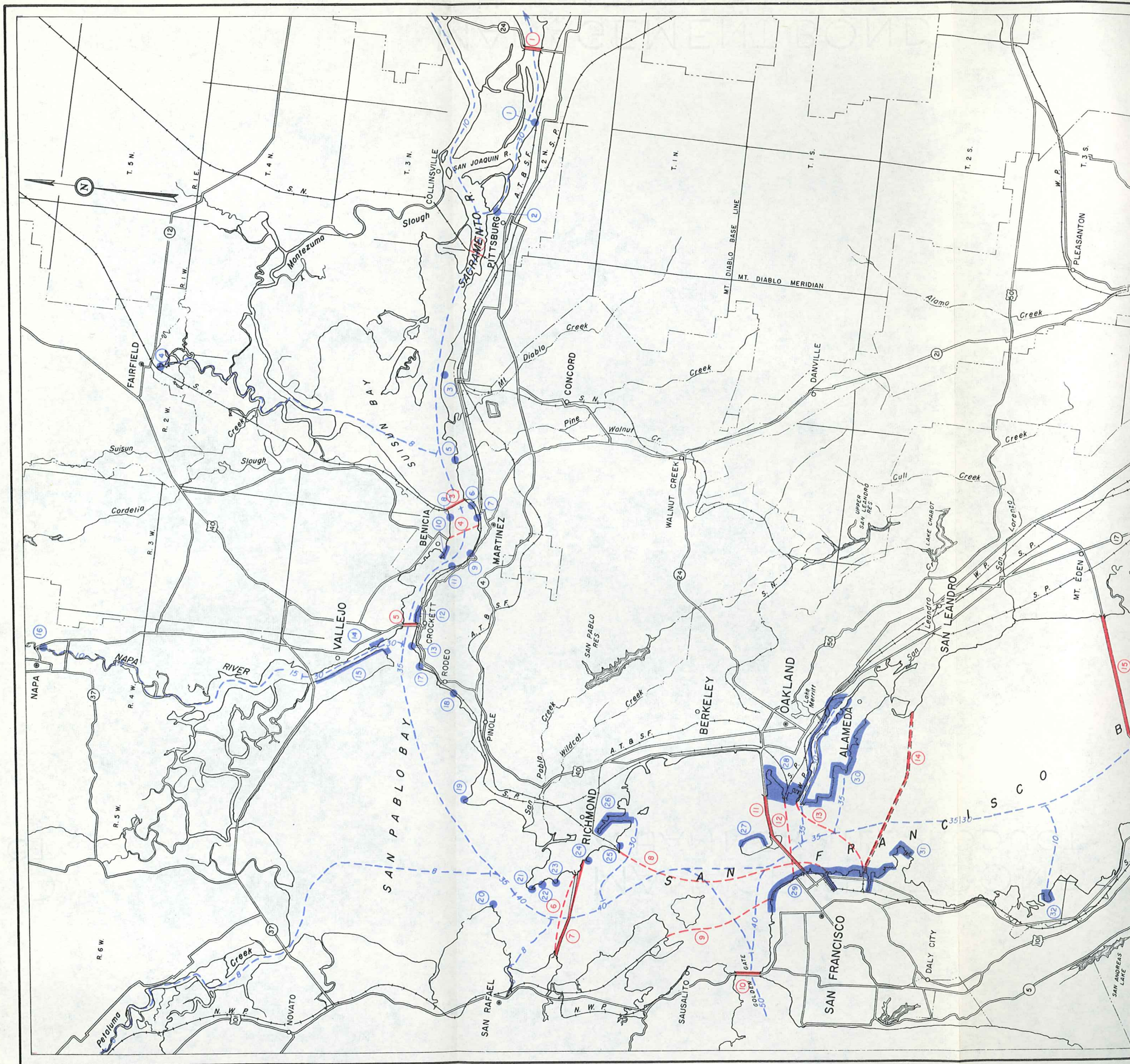
PORT FACILITIES

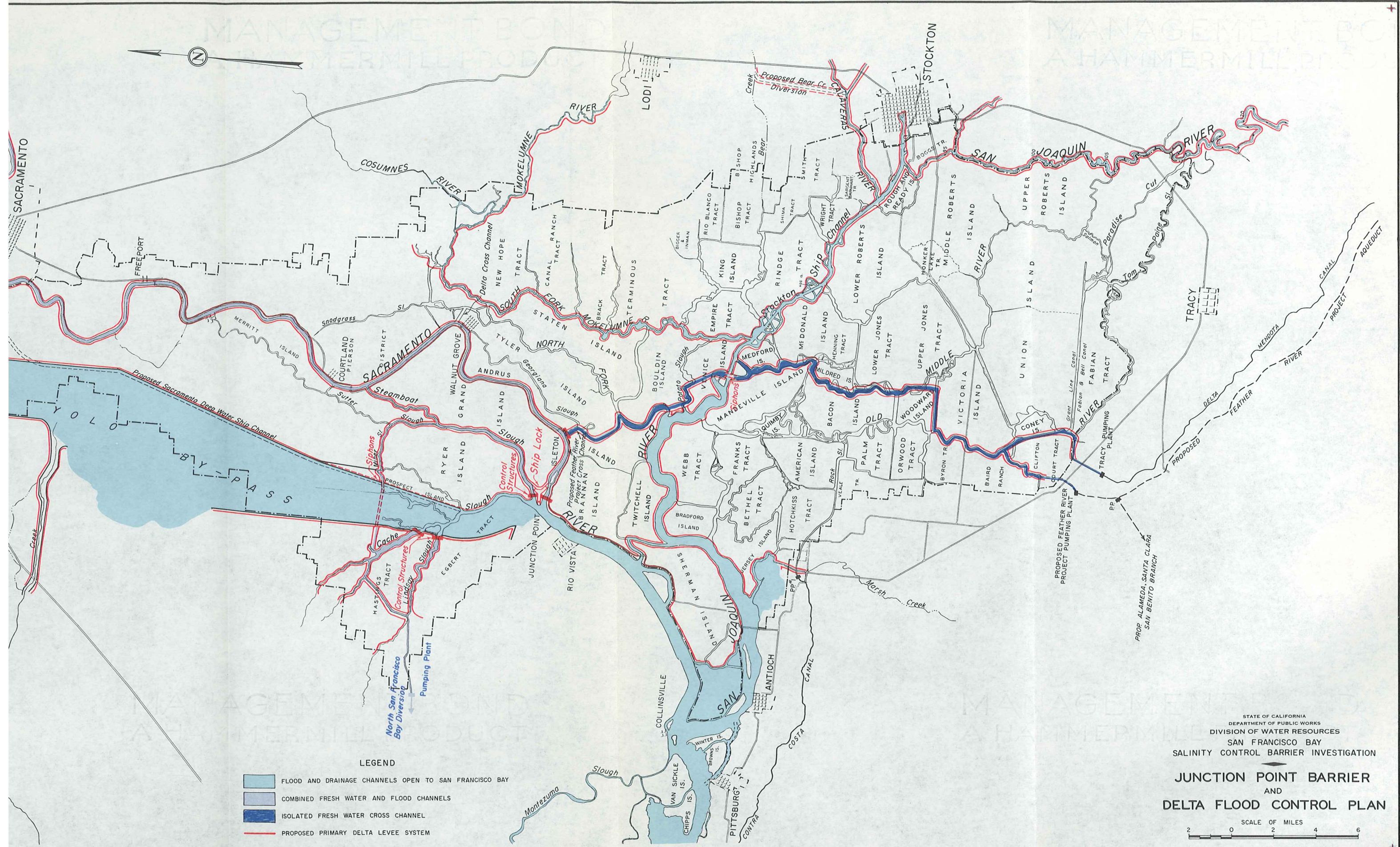
- | | |
|---|-------------------------------------|
| 1 ANTIOCH | 19 GIANT |
| 2 PITTSBURG AND CAMP STONEMAN | 20 McNEARS POINT |
| 3 PORT CHICAGO | 21 PARR-RICHMOND TERMINAL No. 4 |
| 4 SUISUN CITY AND TRAVIS AIR FORCE BASE | 22 POINT ORIENT |
| 5 AVON | 23 POINT MOLATE |
| 6 AMORCO | 24 RICHMOND LONGWHARF |
| 7 MARTINEZ | 25 PARR-RICHMOND TERMINAL No. 1 |
| 8 BENICIA ARSENAL | 26 RICHMOND INNER-HARBOR |
| 9 OZOL | 27 TREASURE ISLAND |
| 10 BENICIA CITY WHARF | 28 PORT OF OAKLAND |
| 11 PORT COSTA | 29 PORT OF SAN FRANCISCO |
| 12 CALIFORNIA-HAWAIIAN SUGAR COMPANY | 30 NAVAL AIR STATION, ALAMEDA |
| 13 AMERICAN SMELTING AND REFINING COMPANY | 31 HUNTERS POINT |
| 14 VALLEJO | 32 SOUTH SAN FRANCISCO |
| 15 MARE ISLAND | 33 PORT OF REDWOOD CITY |
| 16 NAPA | 34 NEWARK SLOUGH |
| 17 OLEUM | 35 NAVAL AIR STATION, MOFFETT FIELD |
| 18 HERCULES | 36 ALVISO |

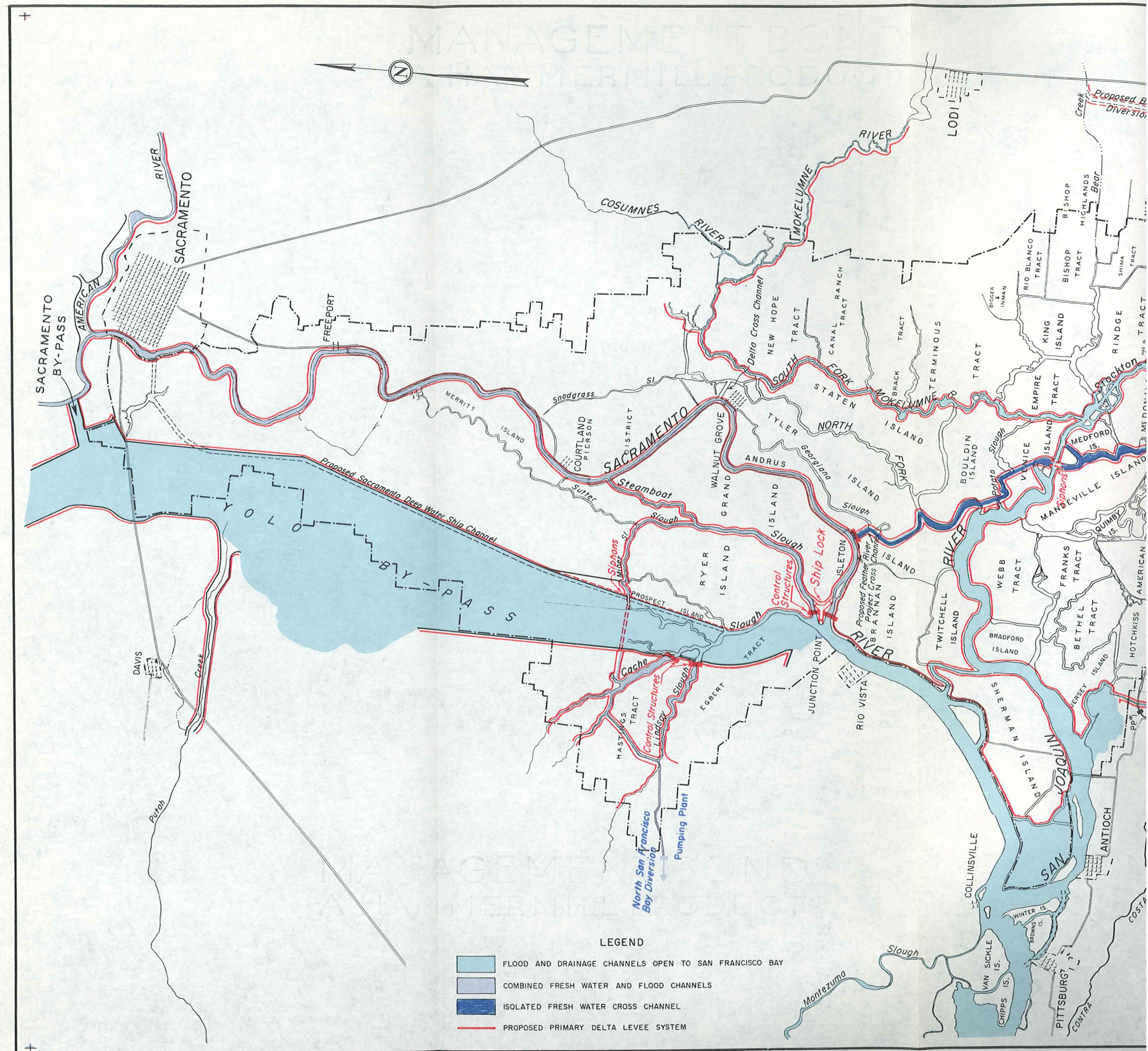
--40-- APPROXIMATE NAVIGATION CHANNEL AND AUTHORIZED DEPTH IN FEET
30 FOOT AUTHORIZED CHANNEL TO SACRAMENTO NOT CONSTRUCTED
27 FOOT AUTHORIZED CHANNEL TO GUADALUPE RIVER NOT CONSTRUCTED

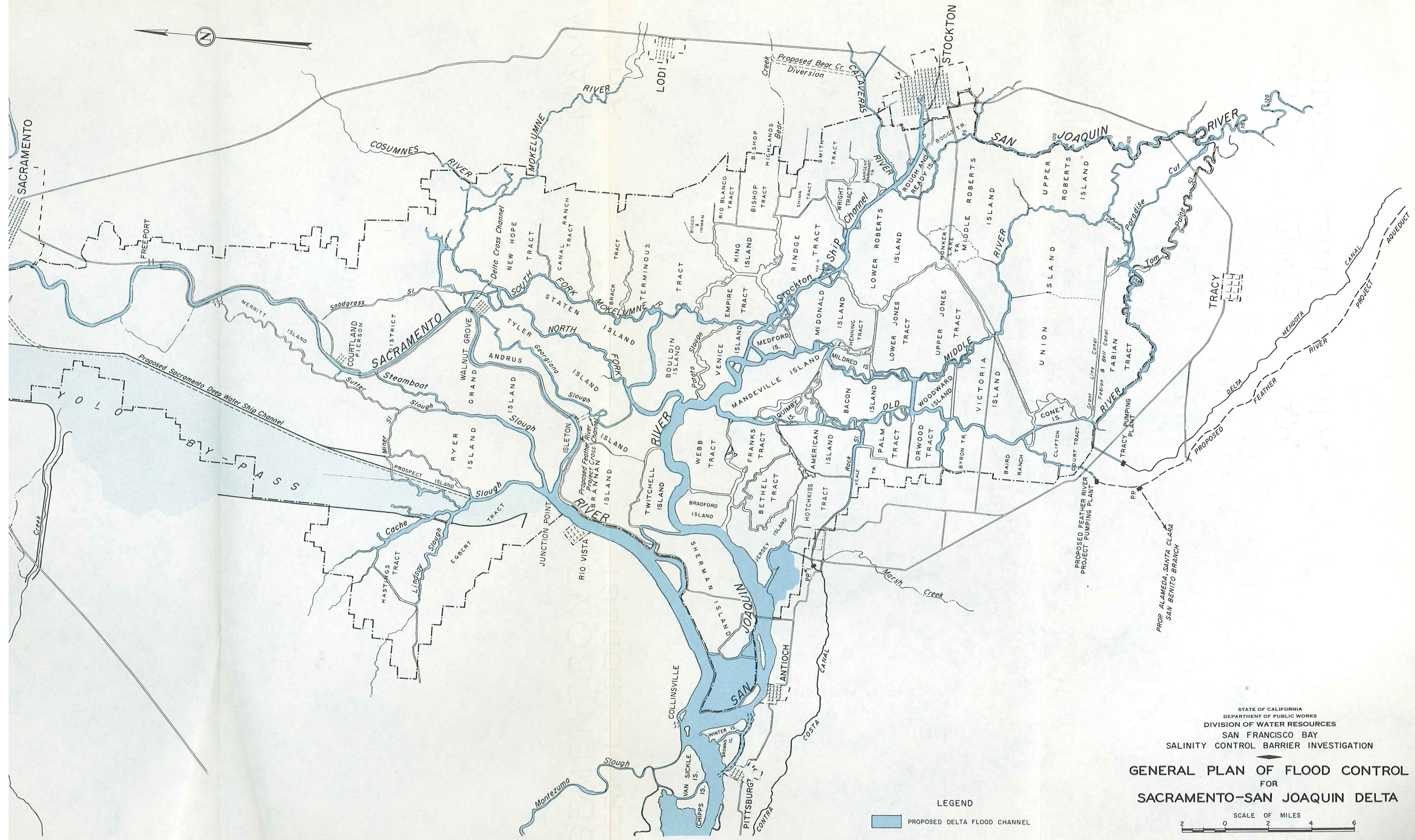
STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF WATER RESOURCES
SAN FRANCISCO BAY
SALINITY CONTROL BARRIER INVESTIGATION
NAVIGATION AND TRANSPORTATION FACILITIES
IN
SAN FRANCISCO BAY AREA

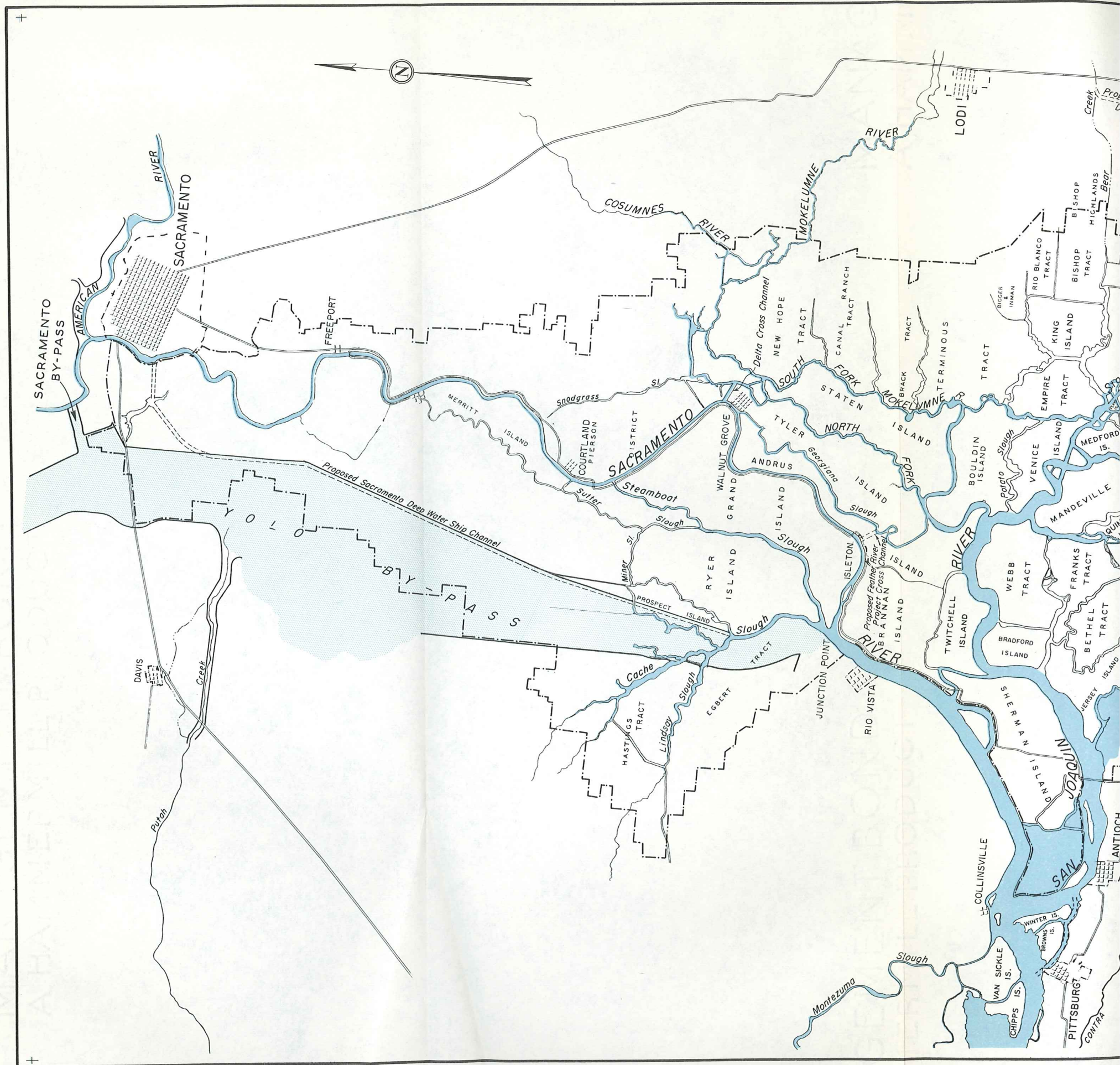












MUNICIPAL AND INDUSTRIAL WASTE DISCHARGES

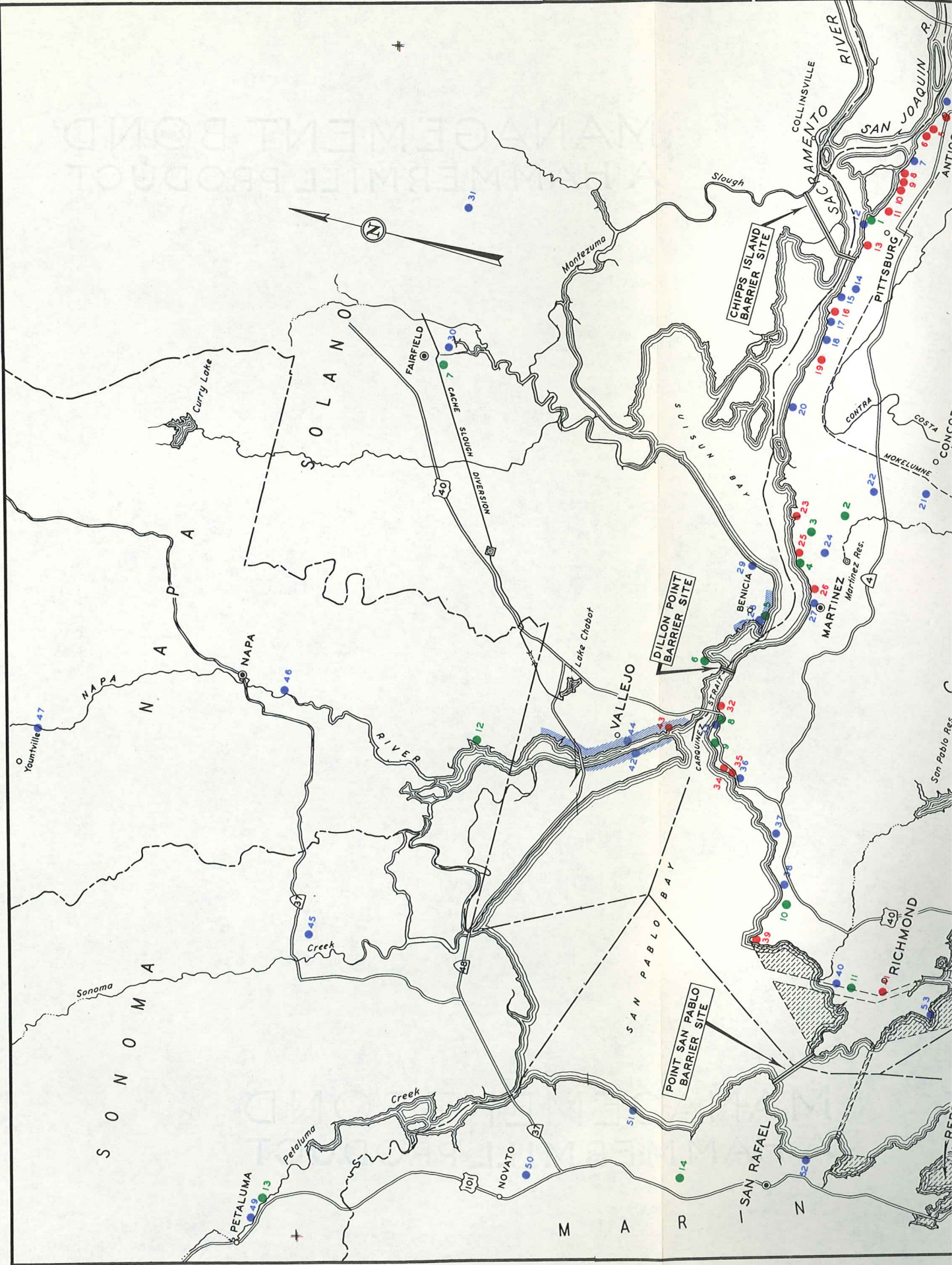
No.	PLANT
1	P. G. & E. Contra Costa Steam Plant (Antioch)
2	Fibreboard Products Inc., San Joaquin Division
3	City of Antioch
4	Hickmott Canning Co.
5	Fibreboard Products Inc., Antioch Division
6	Western California Cannery, Inc.
7	Camp Stoneman
8	Dow Chemical Co.
9	Pioneer Rubber Mills
10	Columbia-Geneva Division, U. S. Steel Corp.
11	Johns-Manville Products Corp.
12	City of Pittsburg
13	P. G. & E. Pittsburg Steam Plant
14	Home Acres Sewer Maintenance Dist.
15	Bella Vista Sanitary Dist.
16	Shell Chemical Corp.
17	River Crest Sewer Maintenance Dist.
18	Shore Acres Sewer Maintenance Dist.
19	General Chemical Co.
20	Port Chicago
21	City of Concord
22	Central Contra Costa Sanitary Dist.
23	Tidewater Associated Oil Co.
24	Mountain View Sanitary Dist.
25	Mountain Copper Co.
26	Shell Oil Co.
27	City of Martinez
28	City of Benicia
29	Benicia Arsenal
30	Cities of Fairfield & Suisun
31	Travis Air Force Base
32	California and Hawaiian Sugar Refining Corp.
33	Crockett-Valona Sanitary Dist.
34	P. G. & E. Oleum Steam Plant
35	Union Oil Co. of California
36	Rodeo Sanitary Dist.
37	City of Pinole
38	Tara Hills Sewer Maintenance Dist.
39	Atlas Powder Co.
40	San Pablo Sanitary Dist.
41	Standard Oil Co. of California
42	Mare Island Naval Shipyard
43	Sperry Division, General Mills Corp.
44	City of Vallejo
45	Sonoma Valley County Sanitation Dist.
46	Napa County Sanitation Dist. No. 1 (Napa)

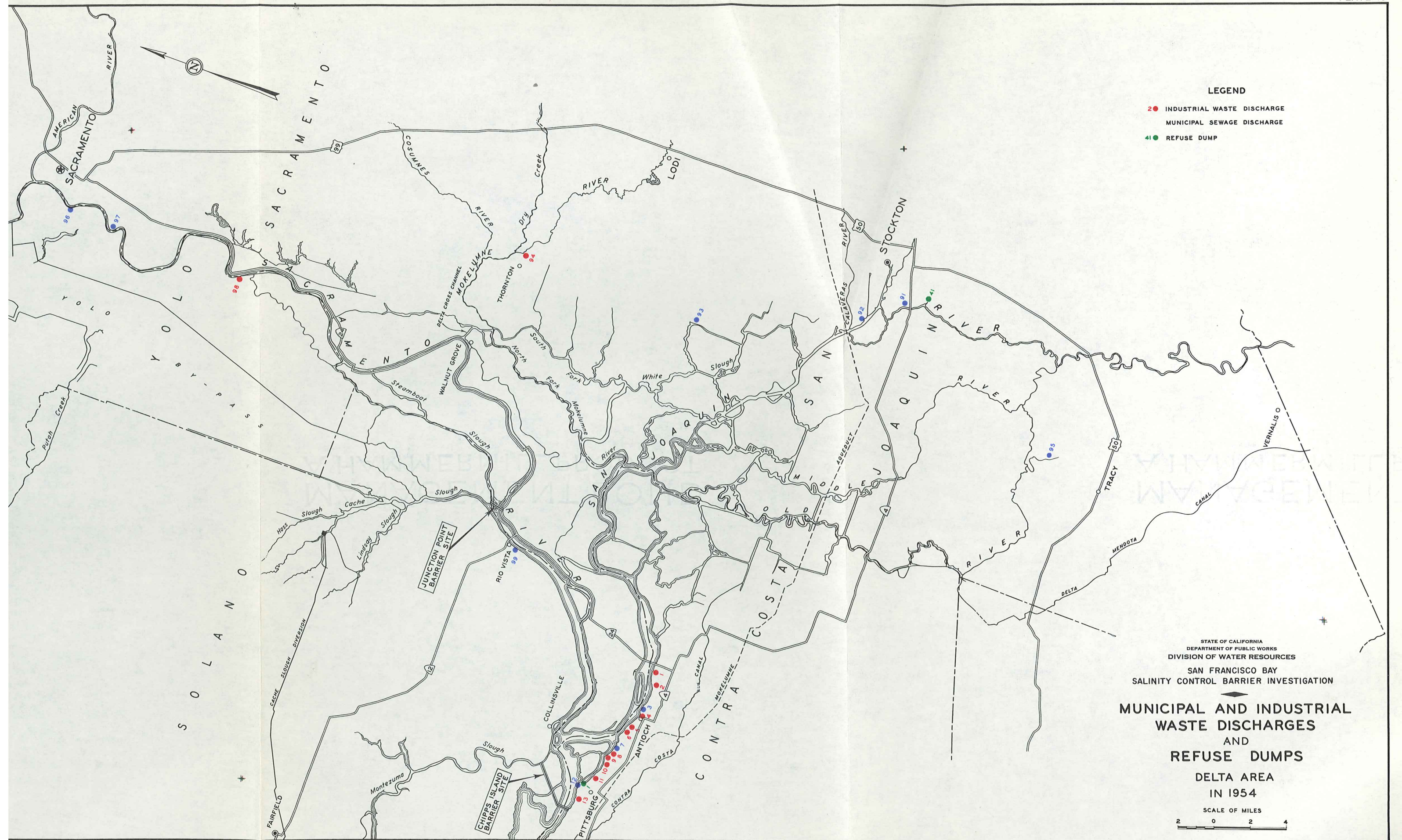
No.	PLANT
47	State Veterans' Home, Yountville
48	City of Calistoga (Not shown on map)
49	City of Petaluma
50	Sanitary Dist. No. 6 of Marin County (Novato)
51	Hamilton Air Force Base
52	San Rafael Sanitation Dist.
53	City of Richmond
54	Steger Sanitary Dist.
55	Pabco Products Inc.
56	East Bay Municipal Utility Dist.
57	Alameda Naval Air Station
58	P. G. & E., Station A (San Francisco)
59	Western Sugar Refinery
60	City of San Francisco, Southeast Dist.
61	P. G. & E., Station P (San Francisco)
62	Hunter's Point Naval Shipyard
63	Sunnydale Sewer, City of San Francisco
64	E. H. Edwards Co.
65	W. P. Fuller & Co.
66	Bethlehem Pacific Coast Steel Corp.
67	Poetsch & Peterson
68	Cities of South San Francisco & San Bruno
69	San Francisco Airport
70	City of Millbrae
71	City of Burlingame
72	City of San Mateo
73	Cities of Belmont & San Carlos
74	Redwood City
75	Ideal Cement Co.
76	Menlo Park Sanitary Dist.
77	City of Palo Alto
78	City of Mountain View
79	Moffett Field Naval Air Station
80	City of Sunnyvale
81	City of San Jose
82	Union Sanitary Dist.
83	City of Hayward
84	Oro Loma Sanitary Dist.
85	City of San Leandro
86	P. G. & E., Station C (Oakland)
87	Westvaco Chem. Div., Food Machinery and Chemical Corp. (Not shown on map)
88	Leslie Salt Co.
89	Morton Salt Co.
90	Marine Magnesium Div. Merck Co.

REFUSE DUMPS

No.	DUMP
1	City of Pittsburg
2	Vine Hill
3	City of Martinez
4	Mountain Copper Co.
5	City of Benicia
6	Benicia Road
7	Cities of Fairfield & Suisun
8	City of Crockett
9	American Smelting & Refining Co., Selby
10	Giant
11	City of Richmond
12	Cities of Napa & Vallejo
13	City of Petaluma
14	Smith Bros.
15	City of Albany
16	City of Berkeley
17	City of Emeryville
18	City of Alameda (Refuse)
19	City of Alameda (Garbage)
20	San Francisco Scavengers

No.	DUMP
21	Bethlehem Pacific Coast Steel Corp.
22	South San Francisco Scavenger Co.
23	San Francisco Airport
24	Burlingame Municipal
25	San Mateo Municipal
26	San Mateo Scavenger Co.
27	Joint Belmont-San Carlos Municipal
28	Redwood City Municipal
29	Bay Road
30	City of Palo Alto
31	City of Mountain View
32	City of Sunnyvale
33	San Jose Sanitation Service, Inc.
34	T. Santos (or Alviso)
35	Los Altos
36	Newby Island
37	Oakland Scavenger Co. (Hayward)
38	East Bay Sanitation Corp.
39	Oakland Scavenger Co. (San Leandro)
40	City of San Leandro





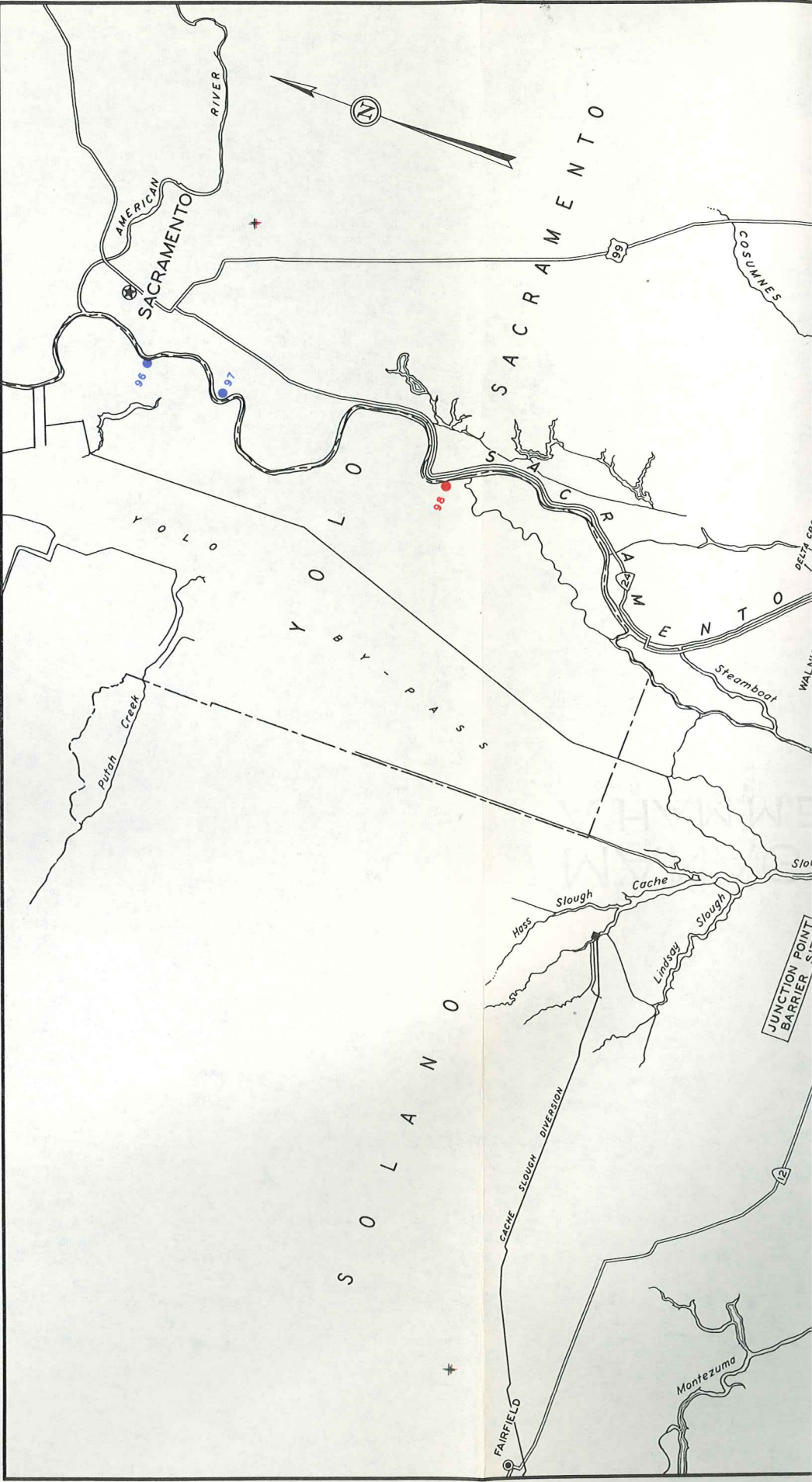
MUNICIPAL AND INDUSTRIAL WASTE DISCHARGES

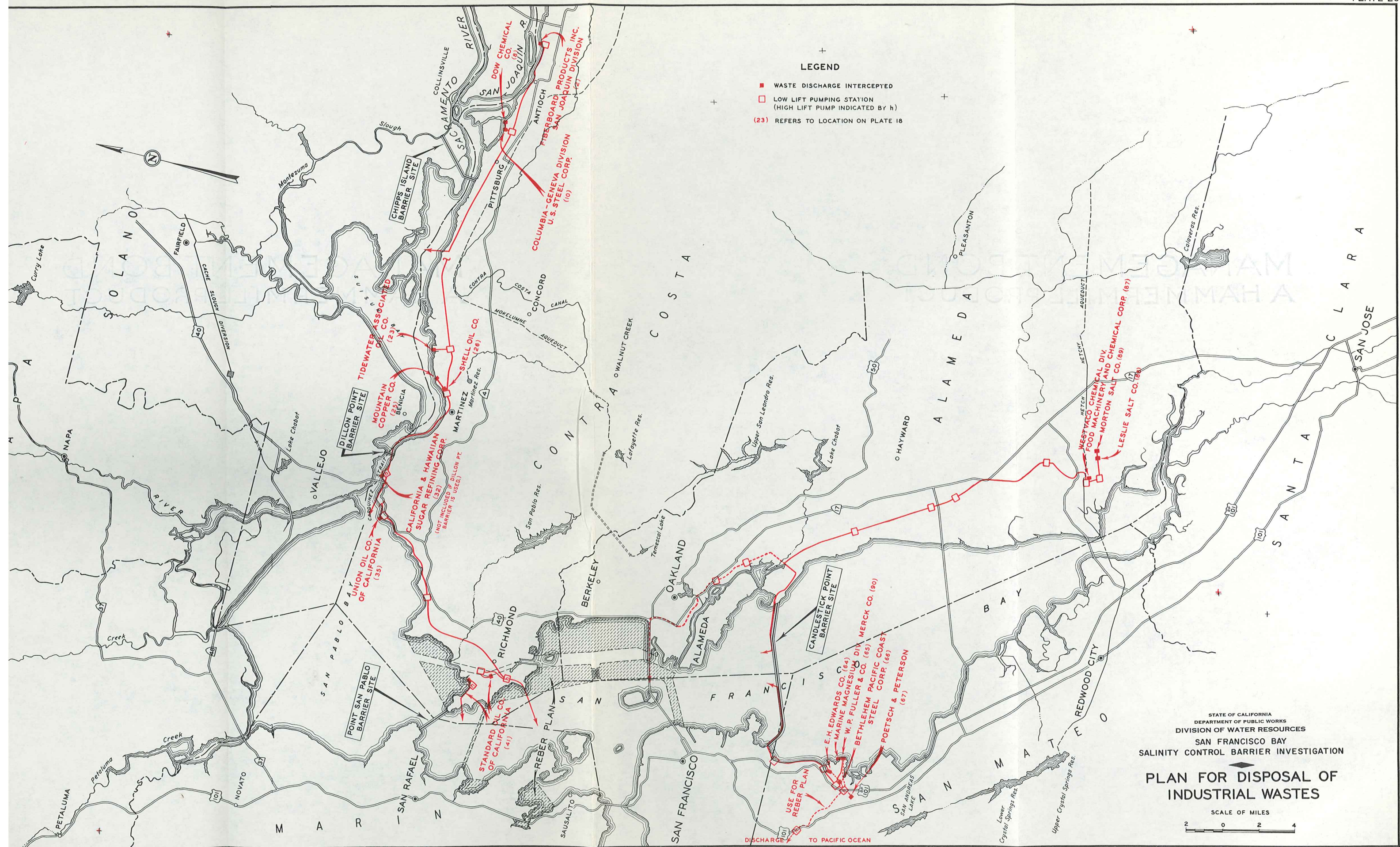
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2	Fibreboard Products Inc., San Joaquin Division
3	City of Antioch
4	Hickmott Canning Co.
5	Fibreboard Products Inc., Antioch Division
6	Western California Cannery, Inc.
7	Camp Stoneman
8	Dow Chemical Co.
9	Pioneer Rubber Mills
10	Columbia-Geneva Division, U. S. Steel Corp.
11	Johns-Manville Products Corp.
12	City of Pittsburg
13	P. G. & E. Pittsburg Steam Plant
91	City of Stockton (South Sewage Treatment Plant)
92	City of Stockton (North Sewage Treatment Plant)
93	City of Lodi
94	Thornton Canning Co.
95	City of Tracy
96	West Sacramento Sanitary Dist.
97	City of Sacramento
98	American Crystal Sugar Co.
99	City of Rio Vista

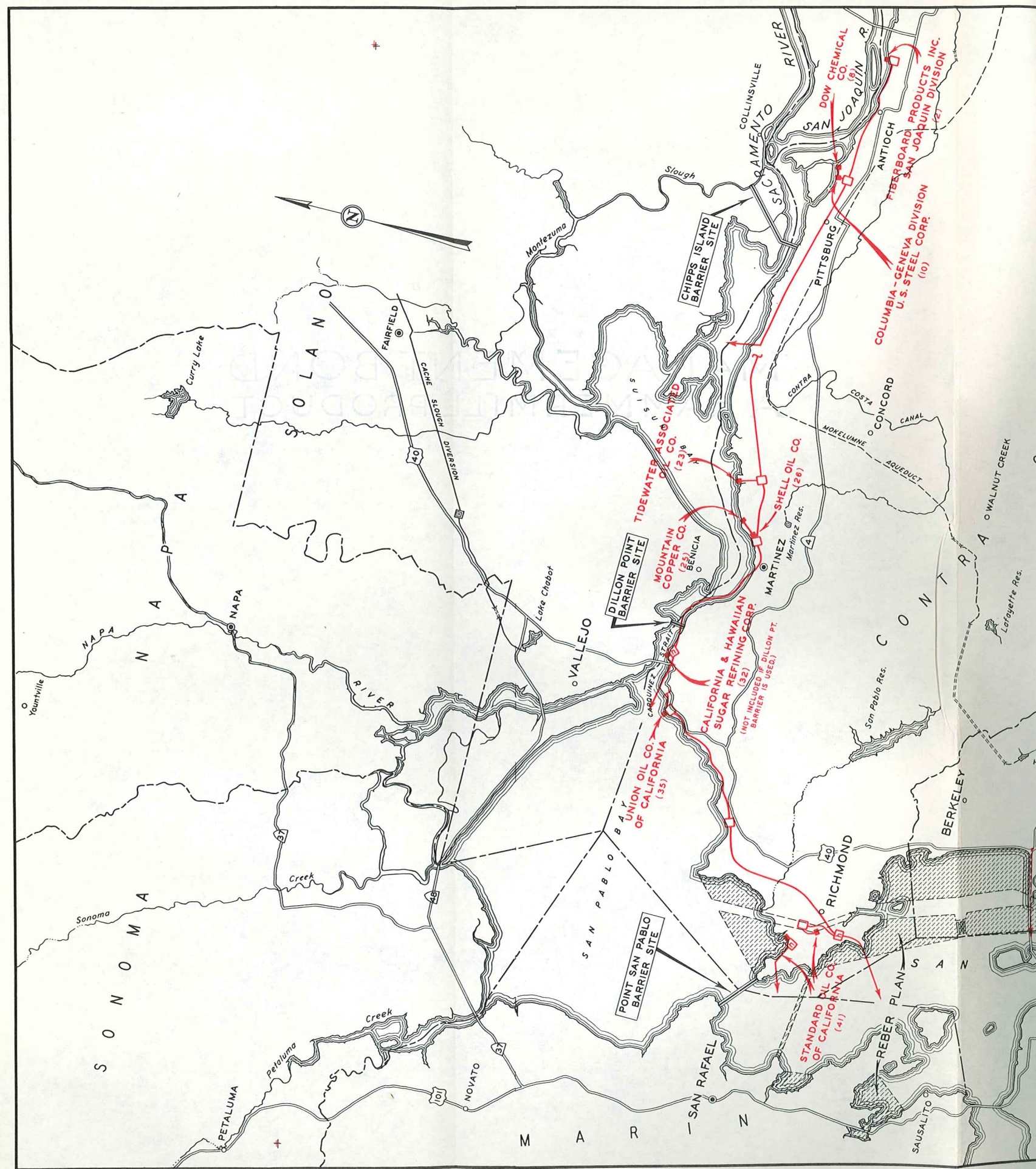
REFUSE DUMPS

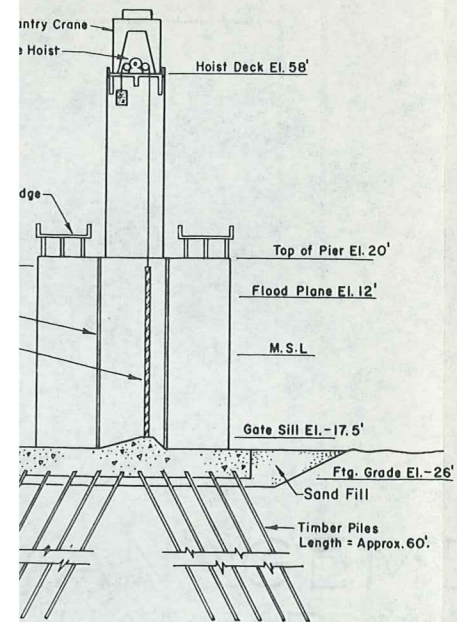
No.	DUMP
1	City of Pittsburg
41	City of Stockton

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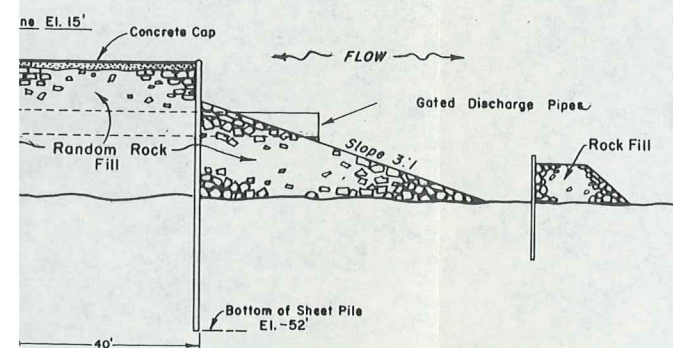






PLAN OF CONTROL STRUCTURES OVER AND STEAMBOAT SLOUGH

SCALE OF FEET
0 20 40

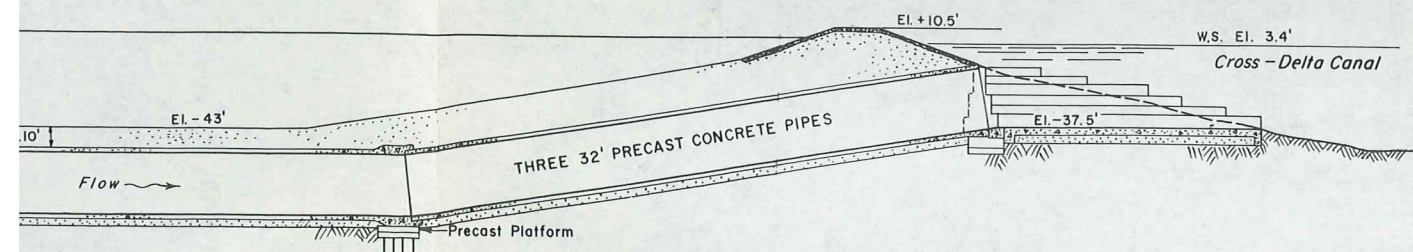


PLAN OF CONTROL STRUCTURES AND LINDSAY SLOUGHS

SCALE OF FEET
0 20 40

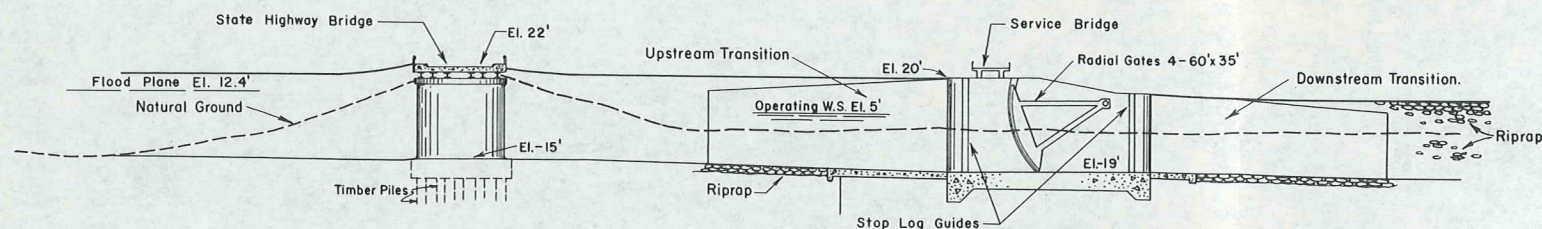
JOAQUIN RIVER

(in Deep Water Channel)



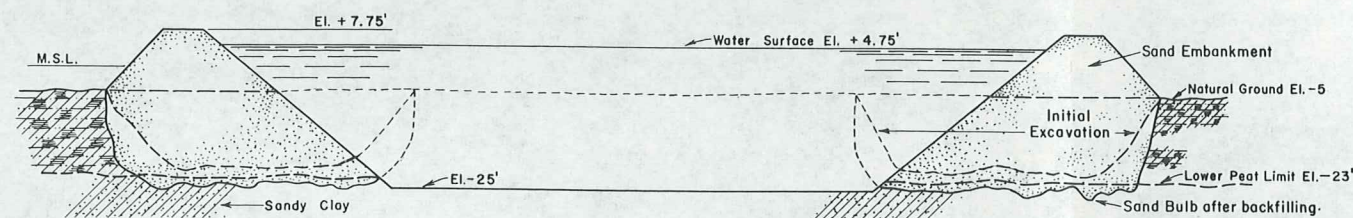
FRESH WATER SIPHONS

SCALE OF FEET
0 50 100



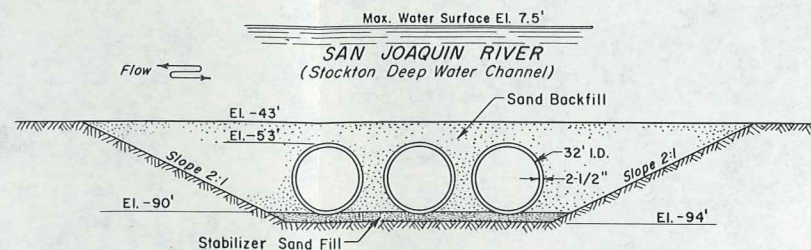
PROFILE OF CROSS-DELTA CANAL HEADWORKS

SCALE OF FEET
40 0 40 80



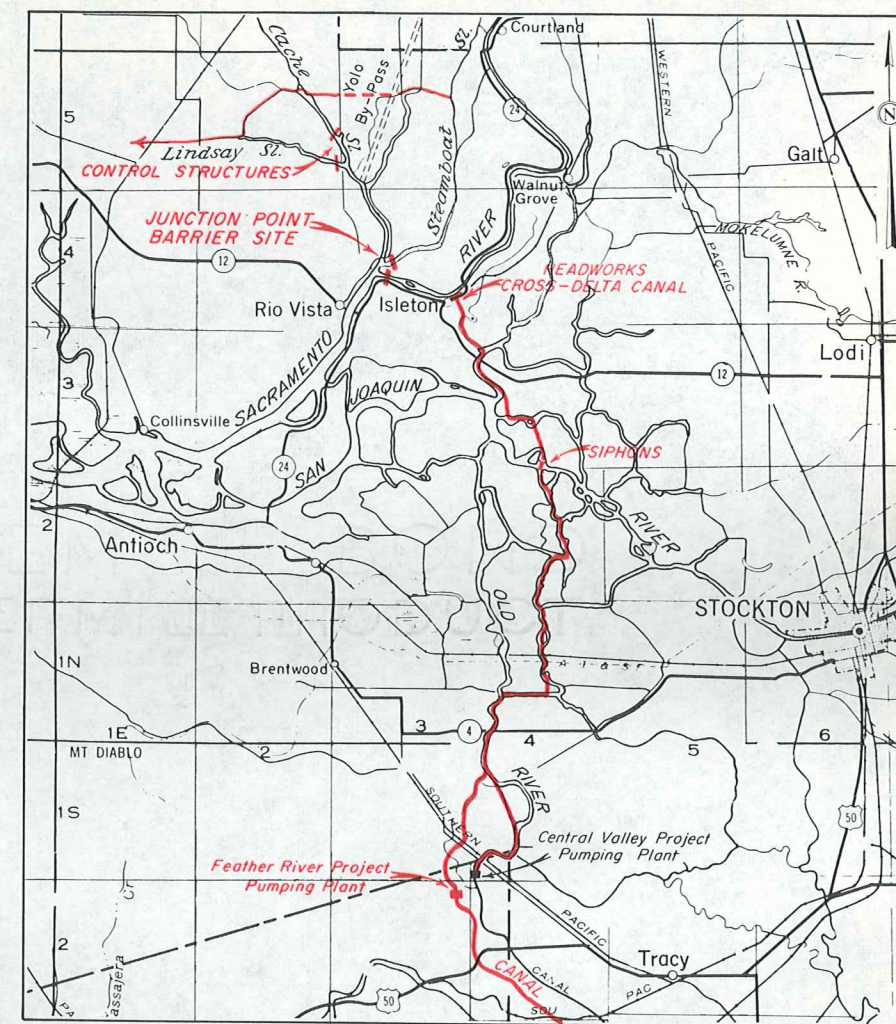
TYPICAL SECTION OF CROSS-DELTA CANAL ANDRUS ISLAND

NOT TO SCALE



CROSS SECTION OF FRESH WATER SIPHONS

SCALE OF FEET
50 0 50 100



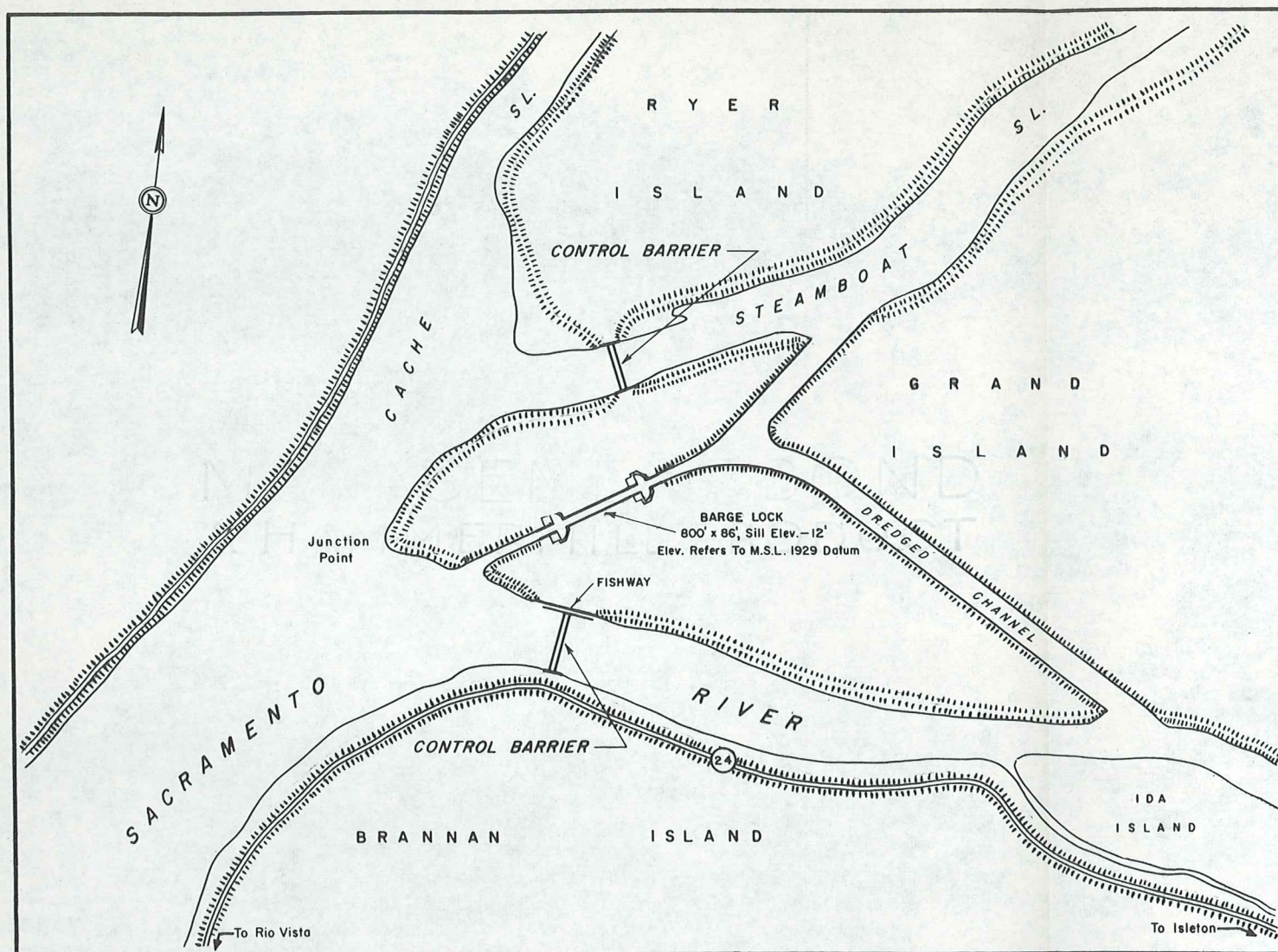
LOCATION MAP

SCALE OF MILES
4 0 4 8

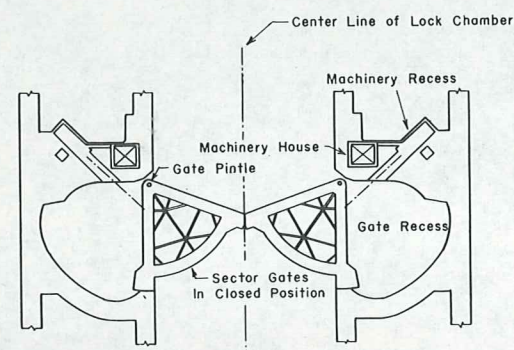
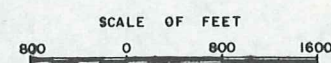
STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF WATER RESOURCES
SAN FRANCISCO BAY
SALINITY CONTROL BARRIER INVESTIGATION

LAYOUT OF JUNCTION POINT BARRIER AND APPURTENANT FACILITIES

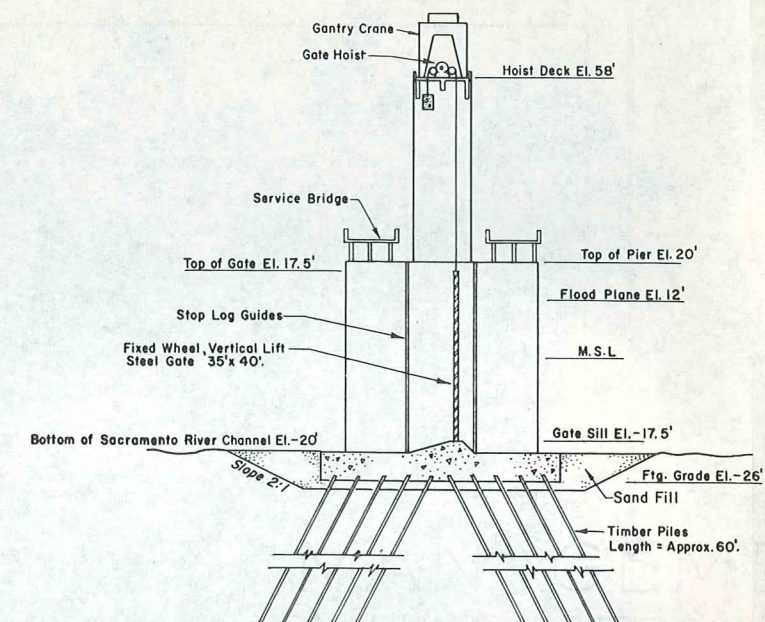
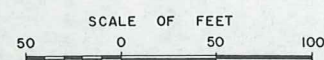
SCALE AS SHOWN



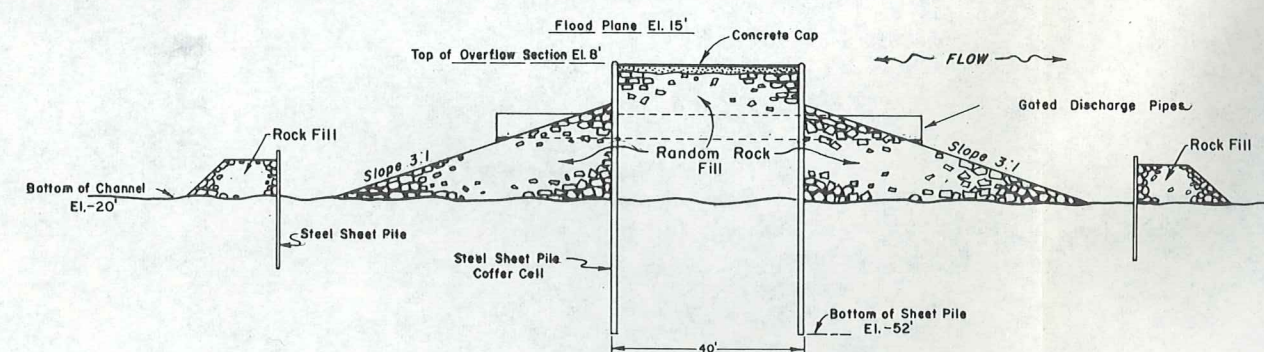
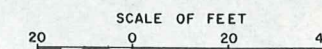
JUNCTION POINT BARRIER SITE



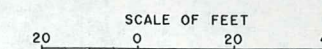
TYPICAL PLAN OF LOCK GATES



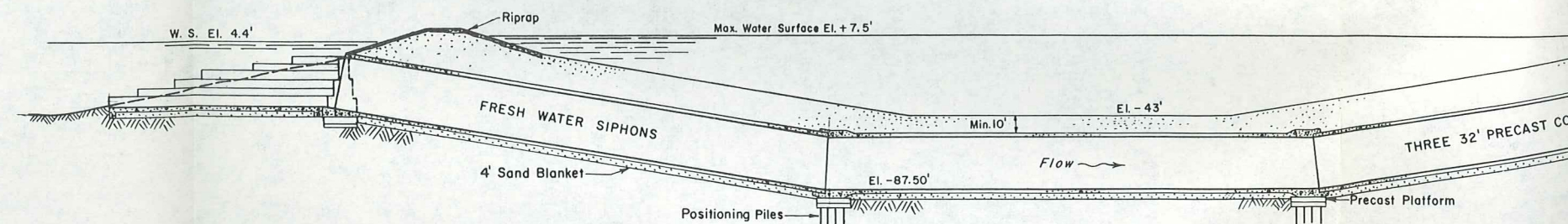
TYPICAL SECTION OF CONTROL STRUCTURES
SACRAMENTO RIVER AND STEAMBOAT SLOUGH



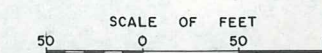
TYPICAL SECTION OF CONTROL STRUCTURES
CACHE AND LINDSAY SLOUGHS

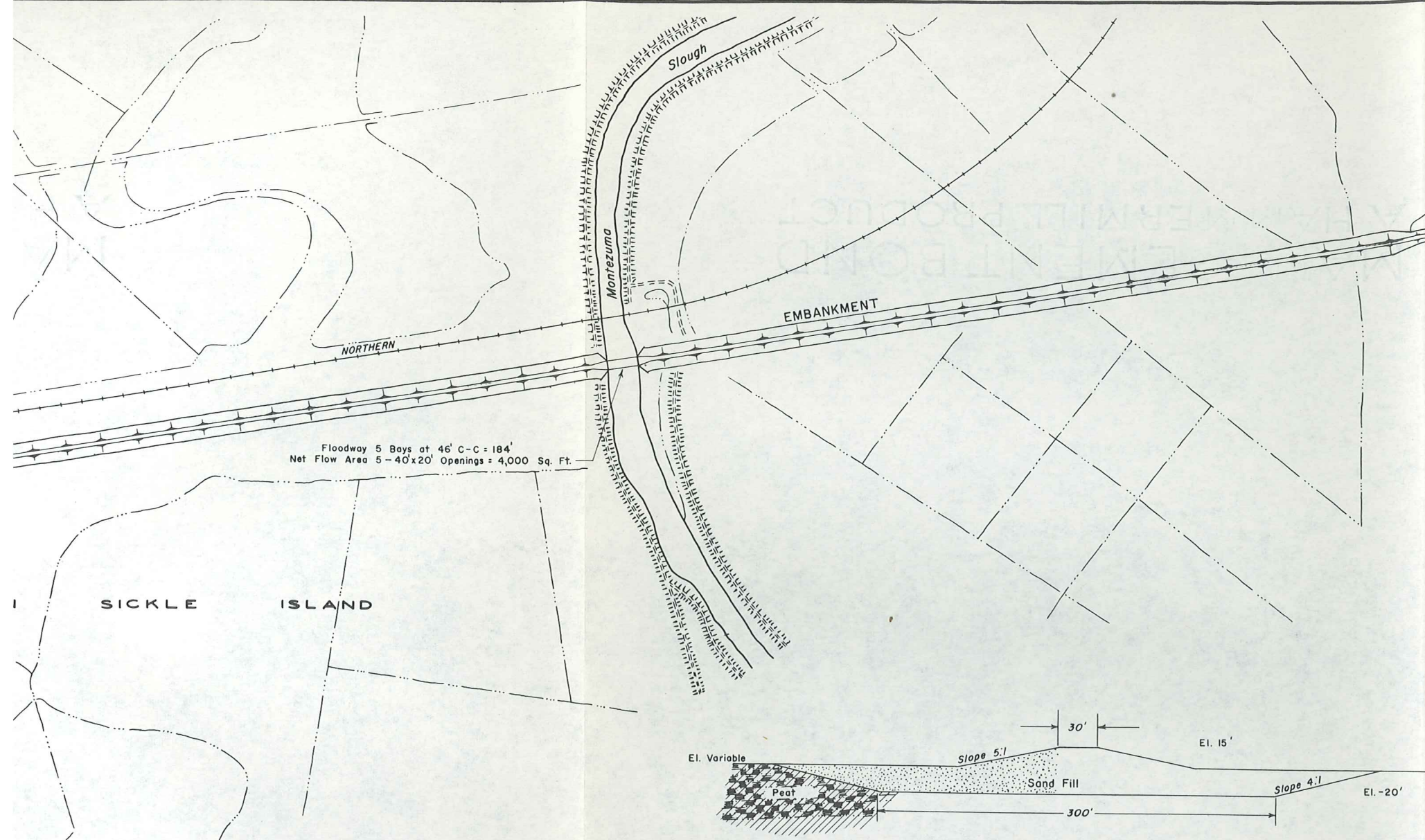


SAN JOAQUIN RIVER
(Stockton Deep Water Channel)



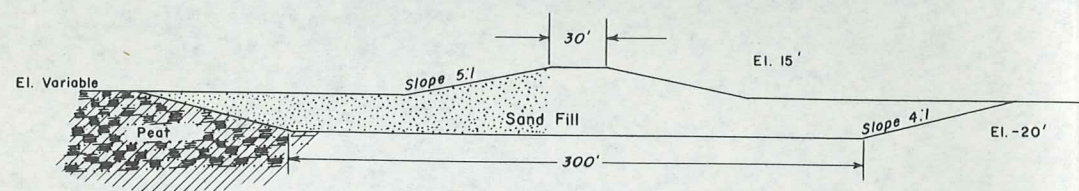
PROFILE OF FRESH WATER SIPHONS





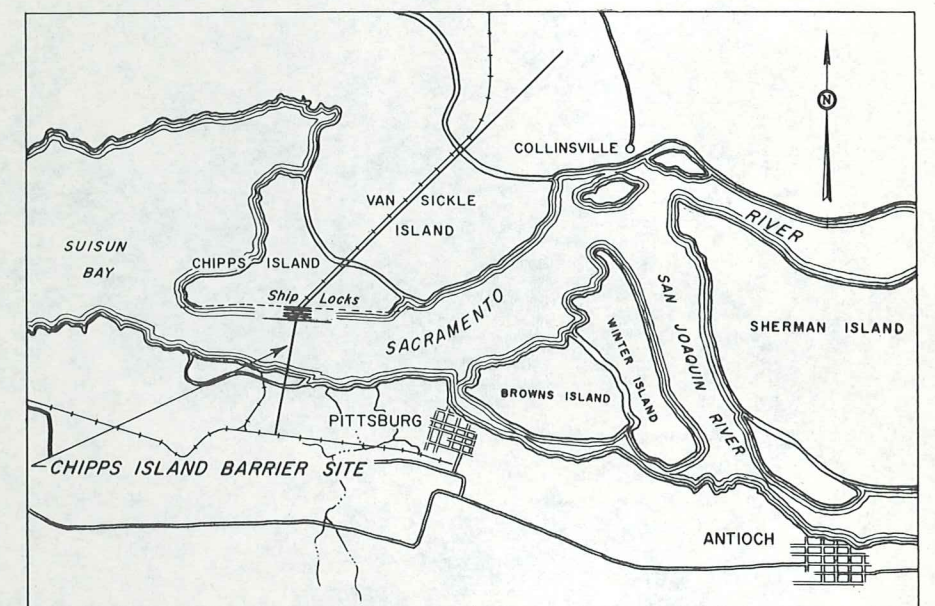
GENERAL PLAN

SCALE OF FEET
0 500 1000 1500



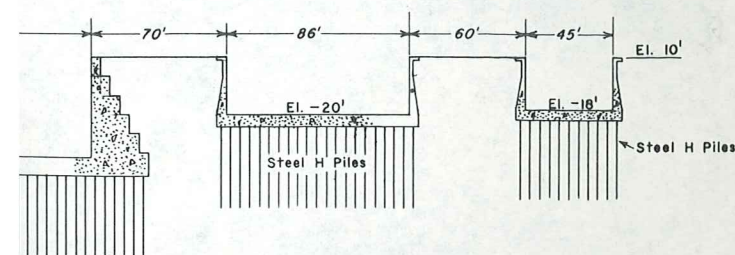
TYPICAL SECTION OF EMBANKMENT

SCALE OF FEET
0 50 100



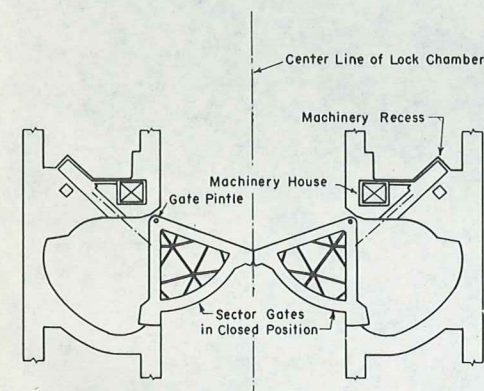
LOCATION MAP

SCALE OF MILES
0 1 2



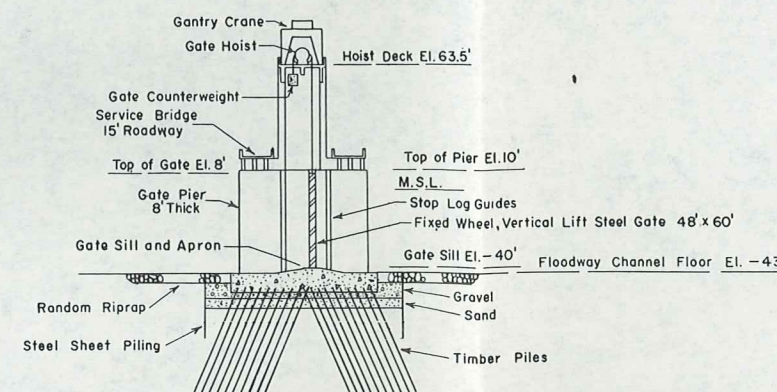
CROSS-SECTION OF SHIP LOCKS

SCALE OF FEET
0 50 100



TYPICAL PLAN OF LOCK GATES

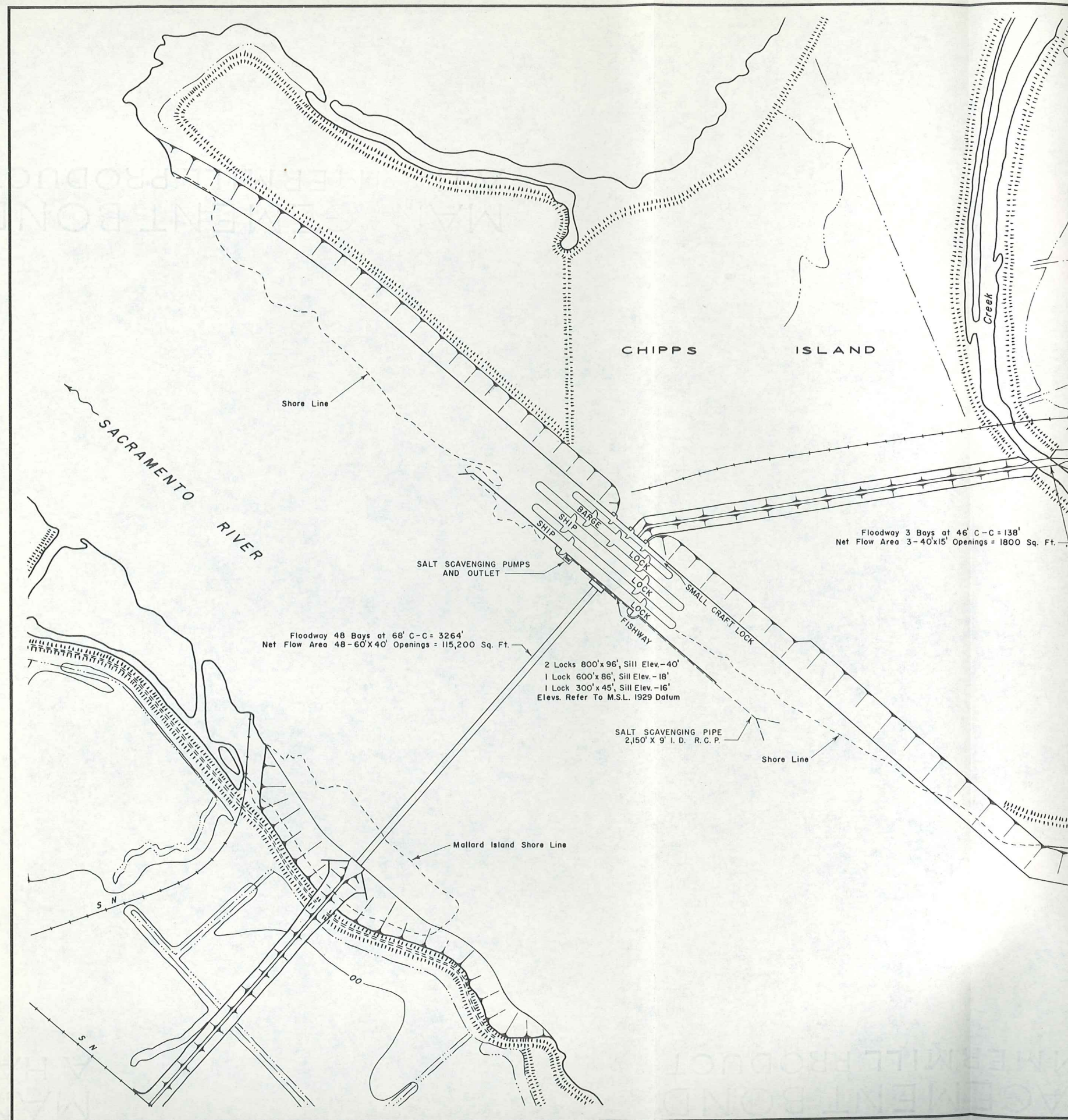
SCALE OF FEET
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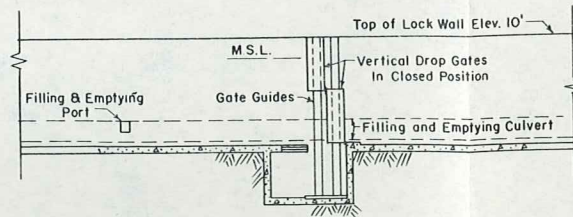
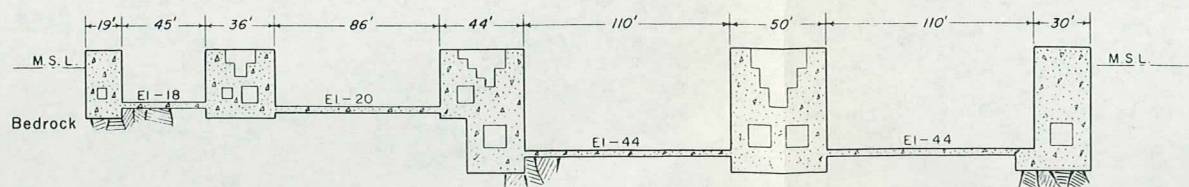
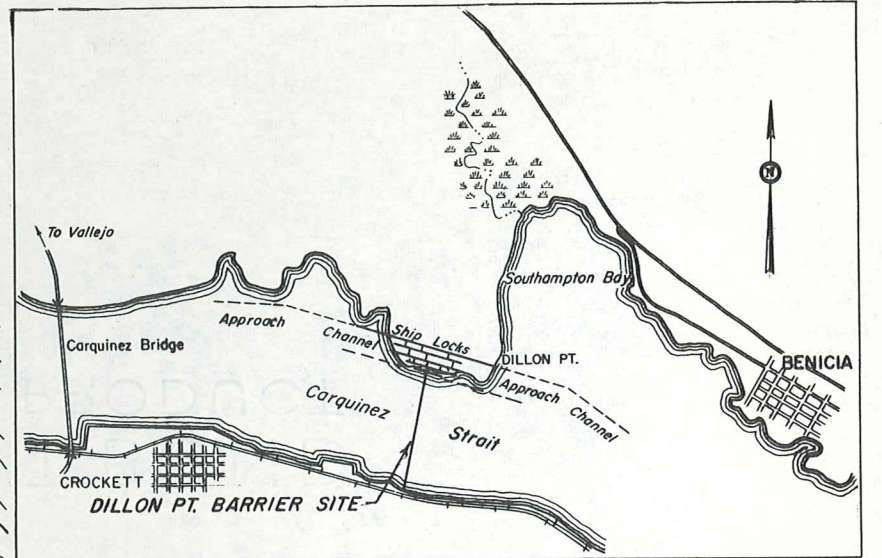
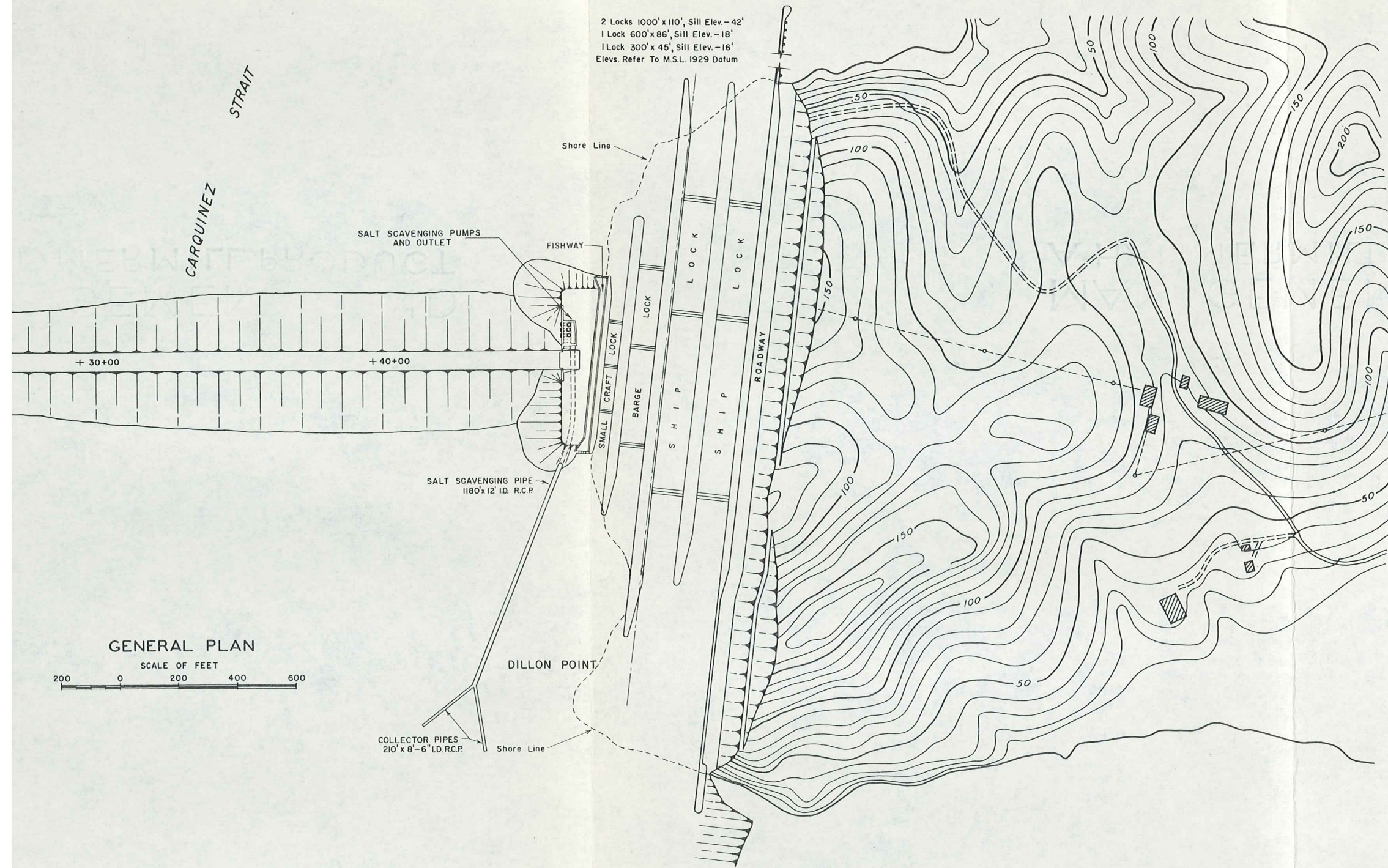


TYPICAL SECTION OF FLOODWAY STRUCTURE

SCALE OF FEET
0 50 100

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SAN FRANCISCO BAY
SALINITY CONTROL BARRIER INVESTIGATION
**LAYOUT OF CHIPPS ISLAND BARRIER
AND
APPURTENANT FACILITIES**
SCALE AS SHOWN

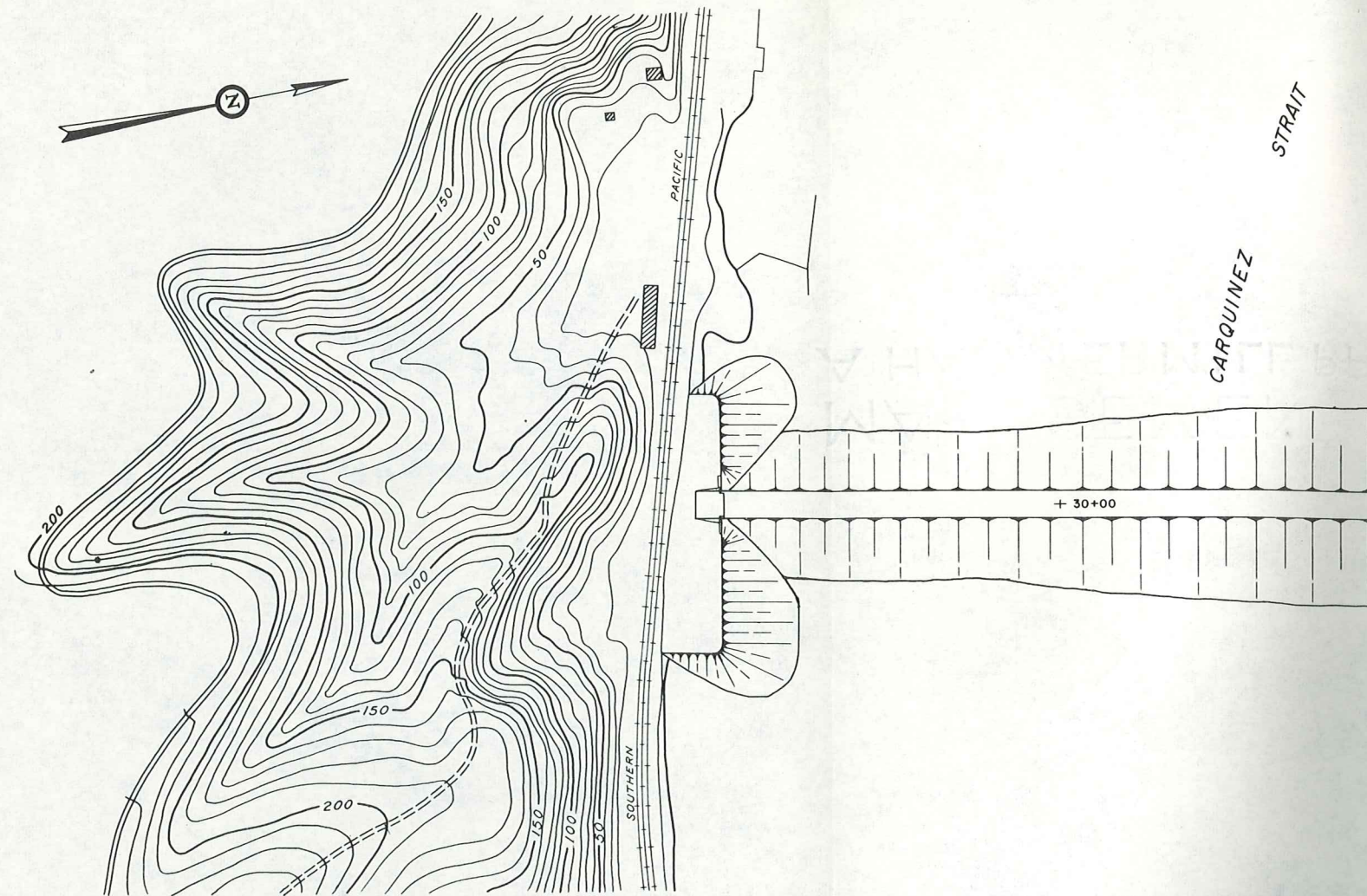




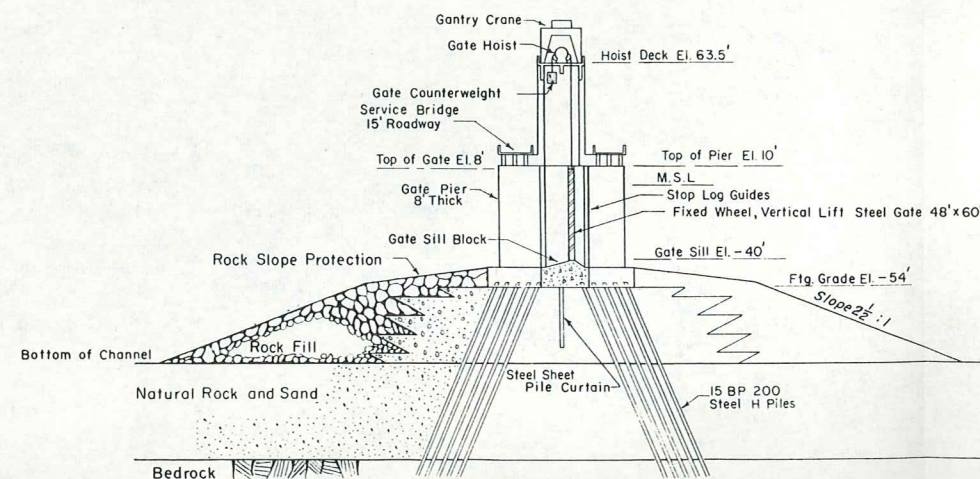
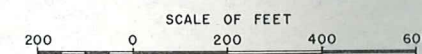
STATE OF CALIFORNIA
 DEPARTMENT OF PUBLIC WORKS
 DIVISION OF WATER RESOURCES
 SAN FRANCISCO BAY
 SALINITY CONTROL BARRIER INVESTIGATION

LAYOUT OF DILLON POINT BARRIER
 AND
 APPURTENANT FACILITIES

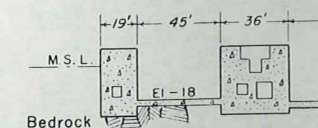
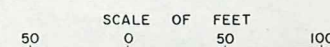
SCALE AS SHOWN

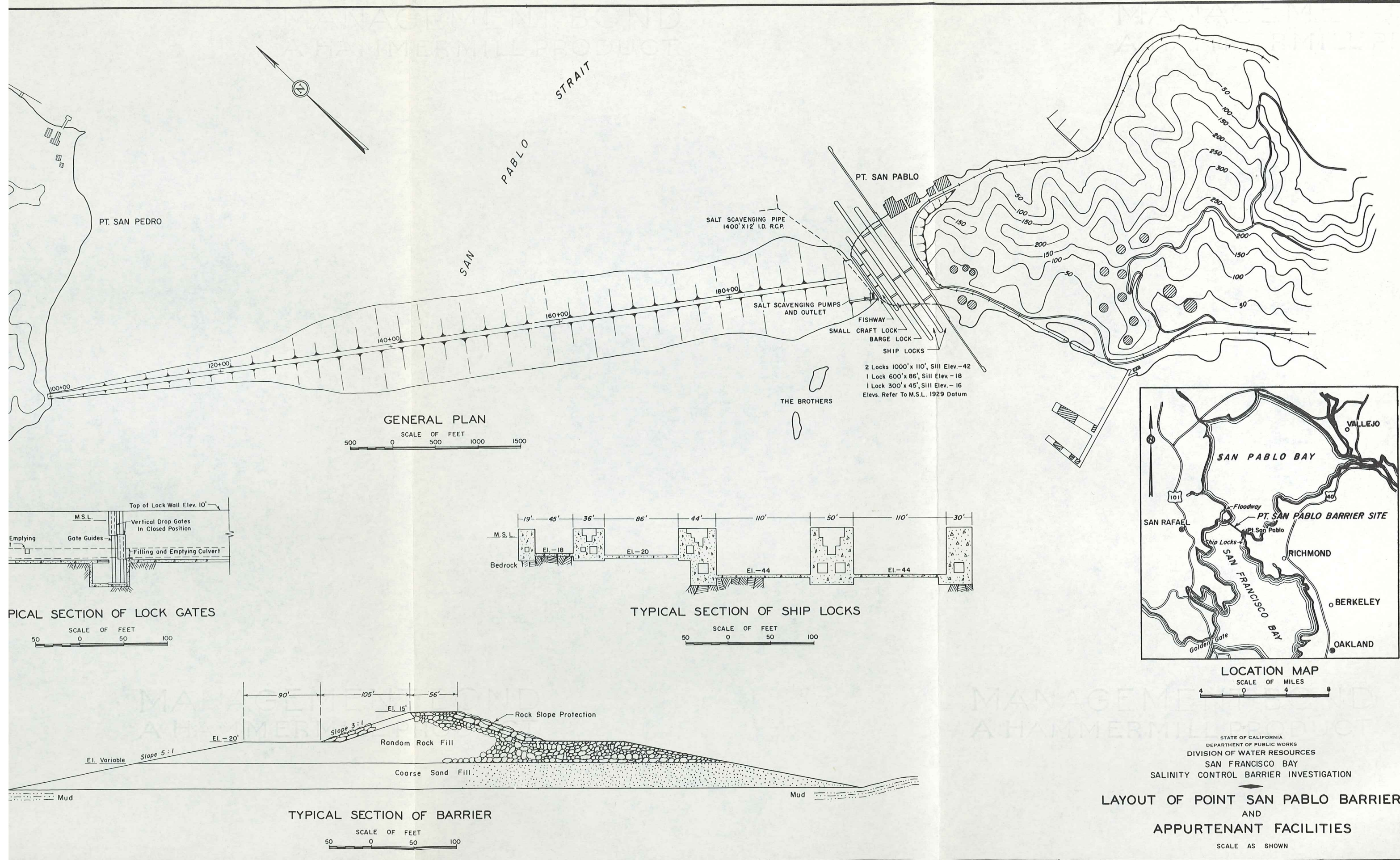


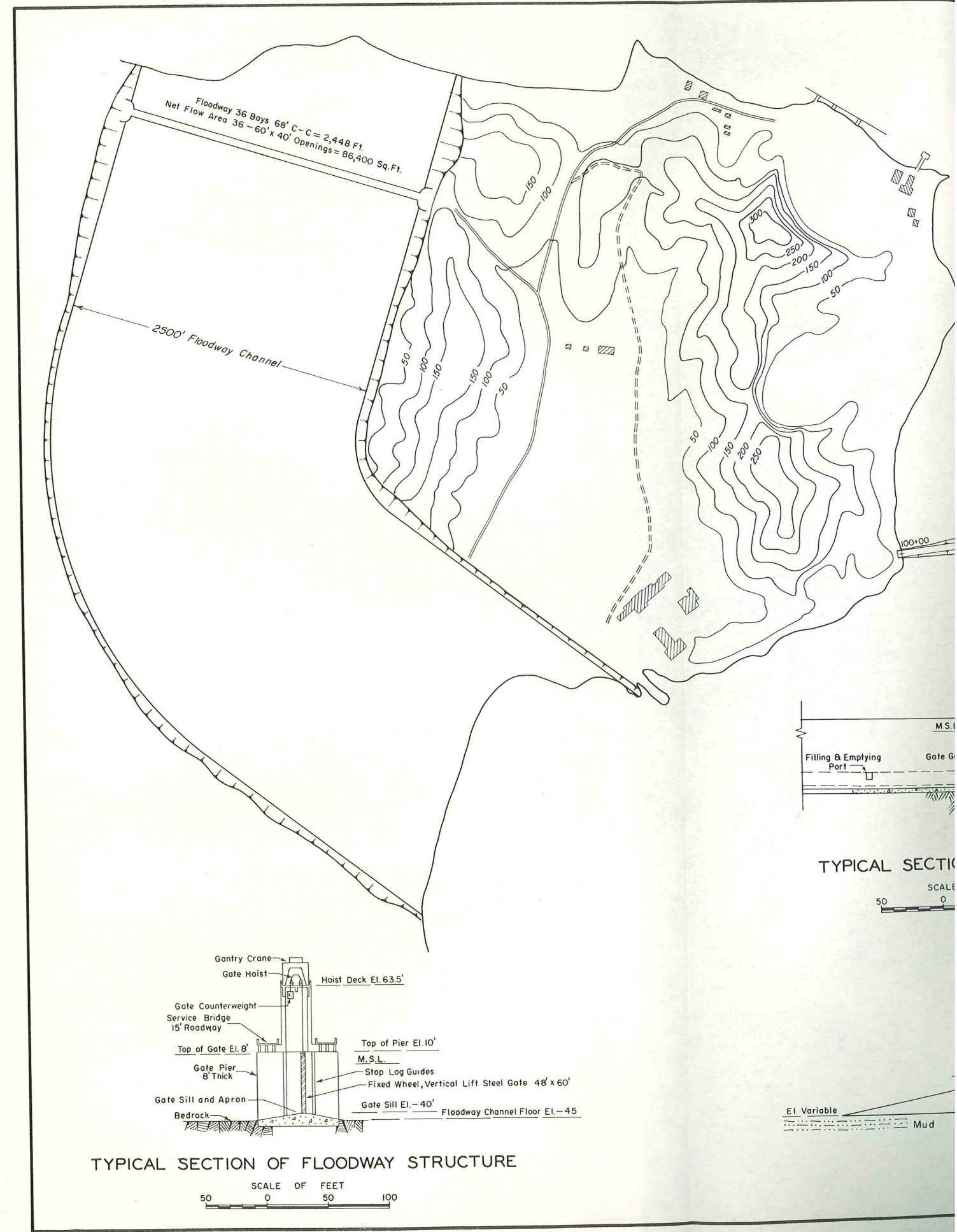
GENERAL PLAN

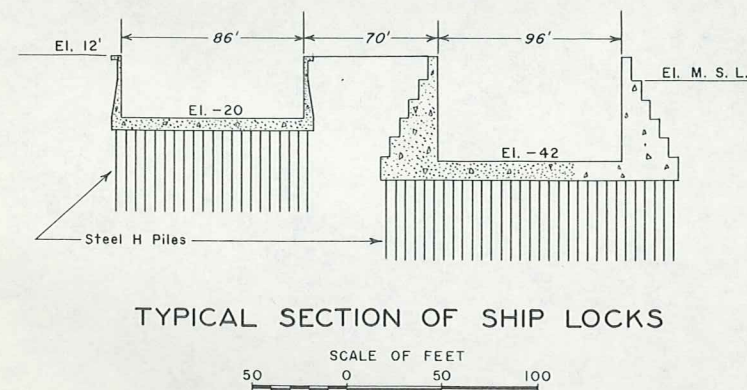
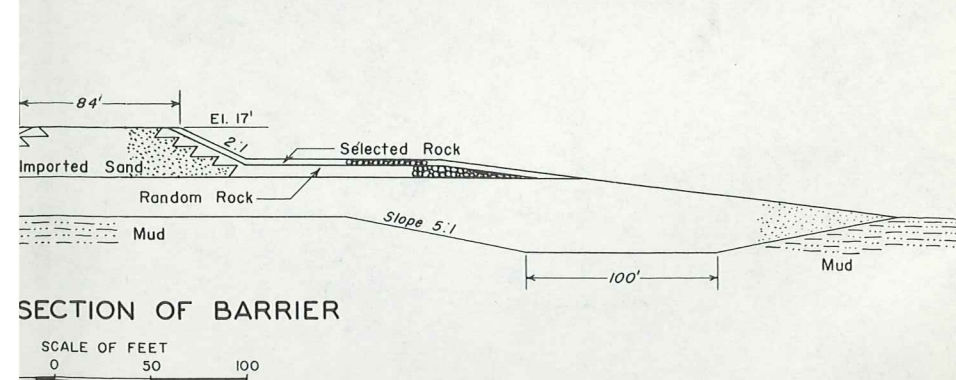
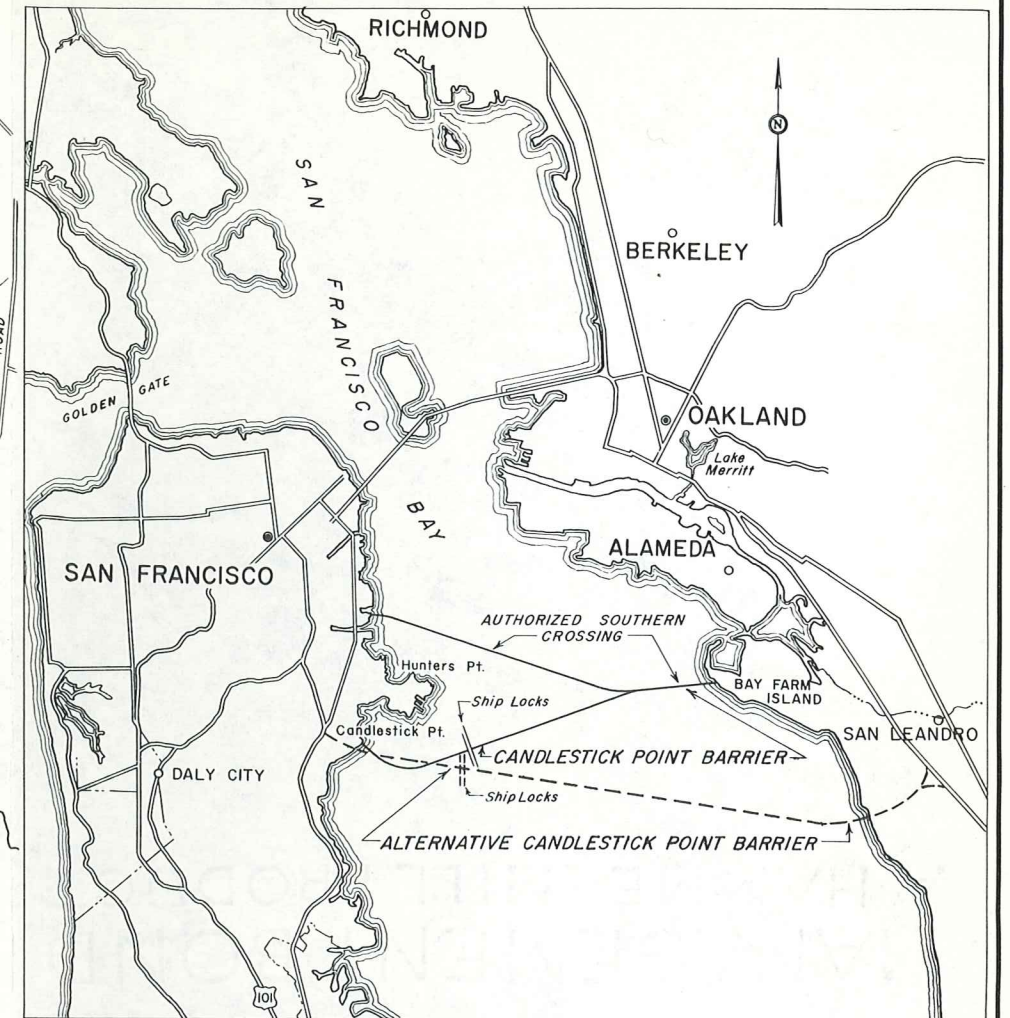
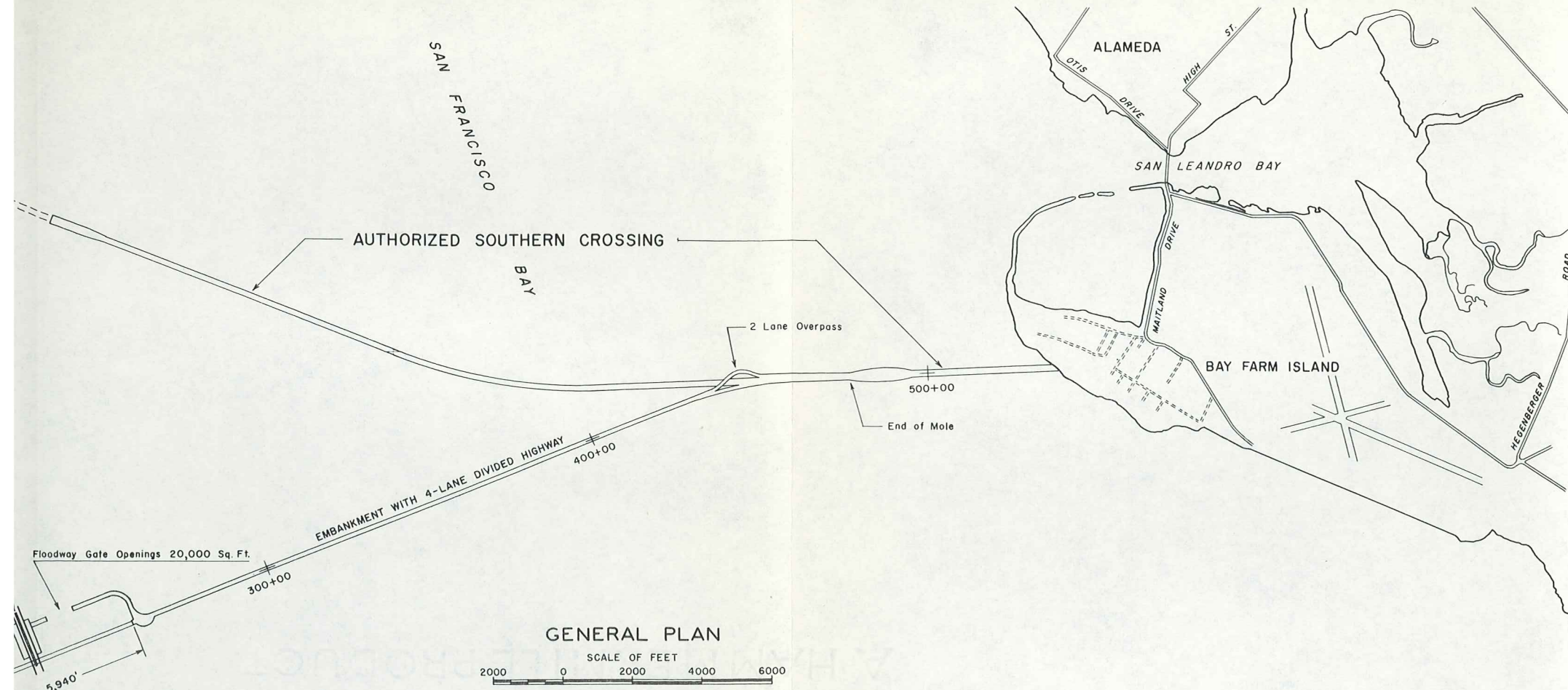


TYPICAL SECTION OF FLOODWAY STRUCTURE
AND BARRIER EMBANKMENT





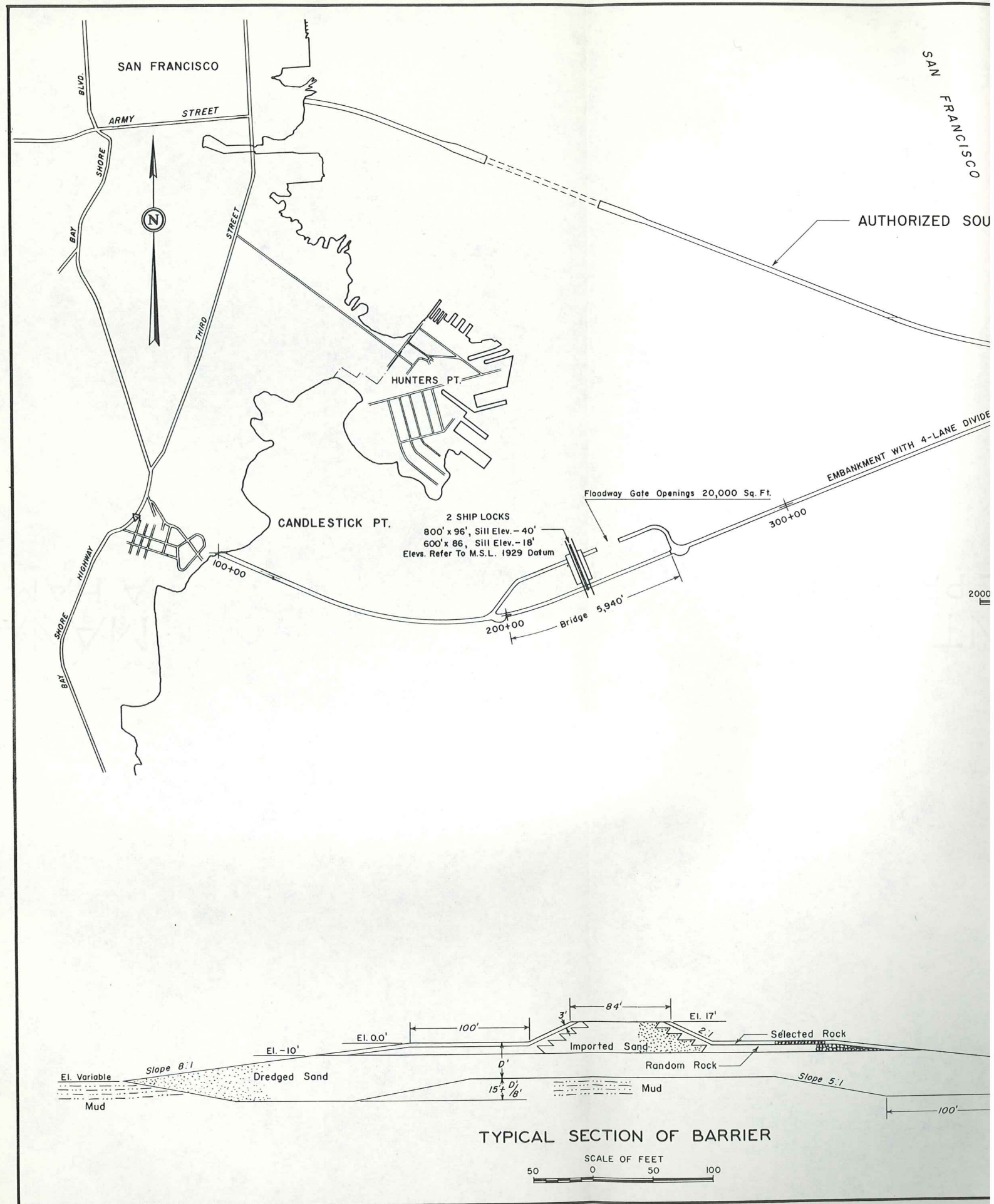


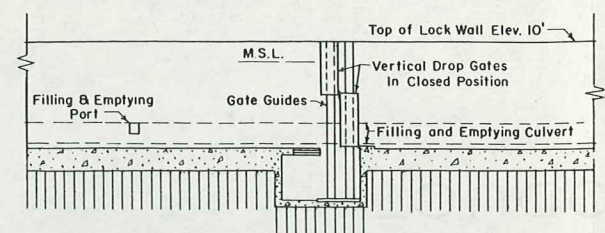


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SAN FRANCISCO BAY
SALINITY CONTROL BARRIER INVESTIGATION

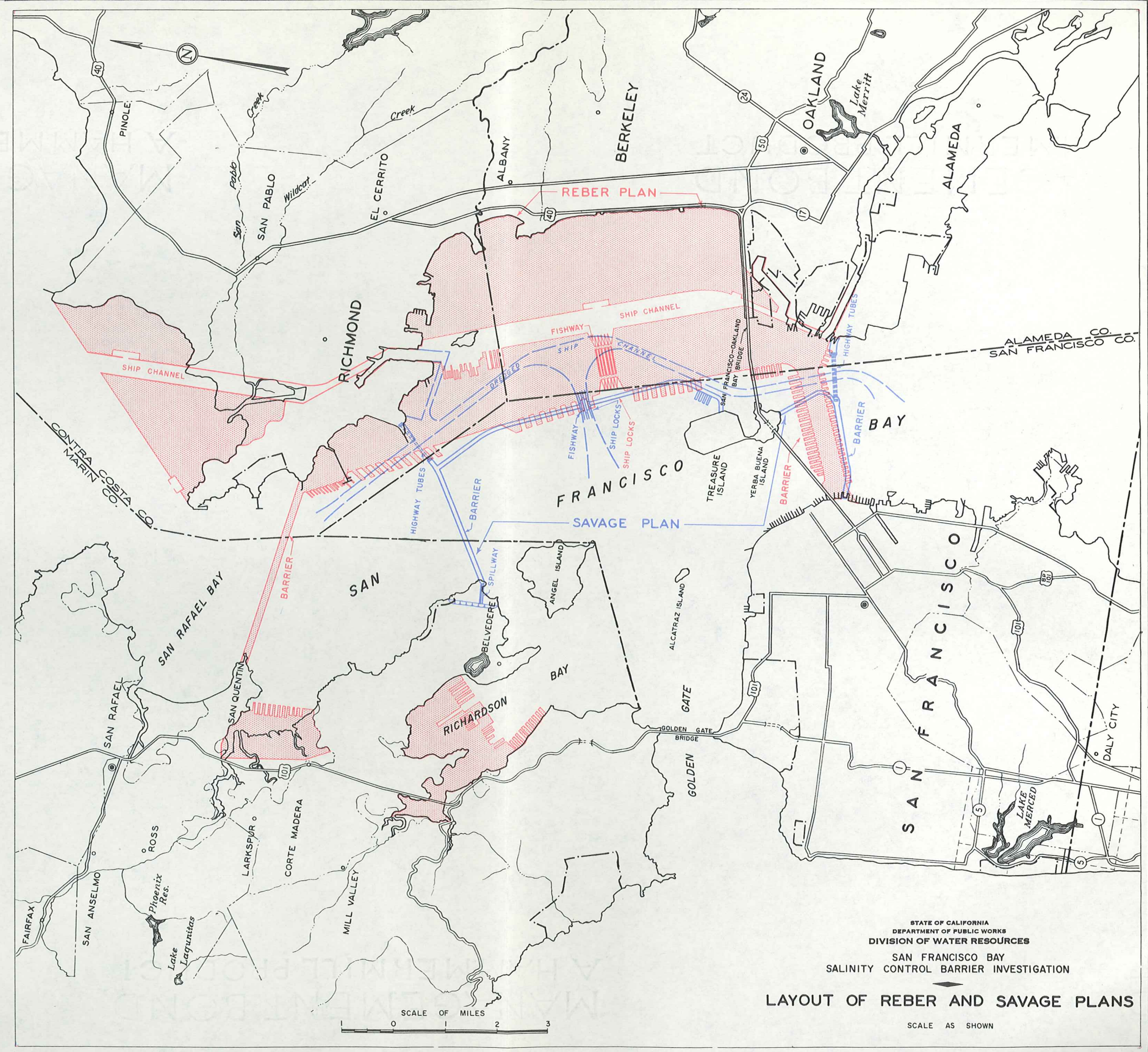
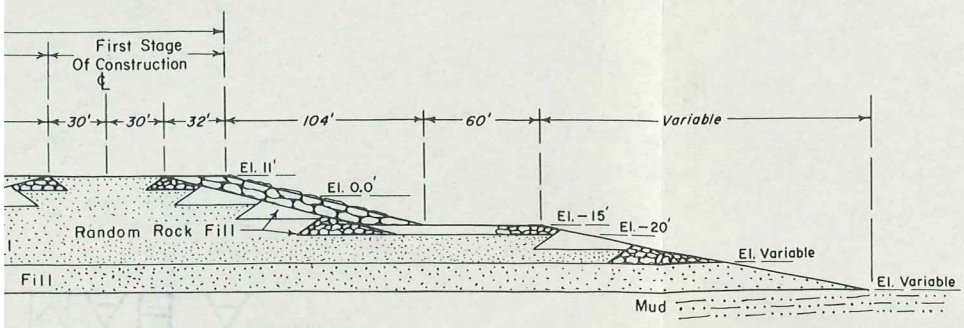
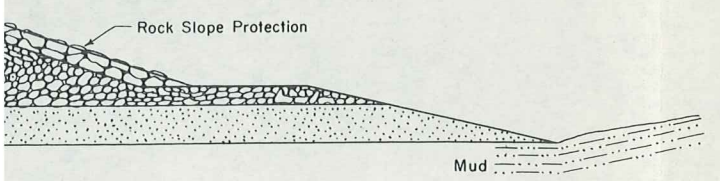
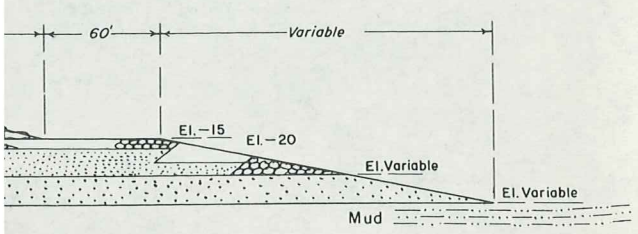
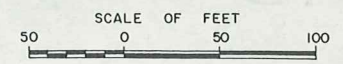
**LAYOUT OF CANDLESTICK POINT BARRIER
AND
APPURTENANT FACILITIES**

SCALE AS SHOWN

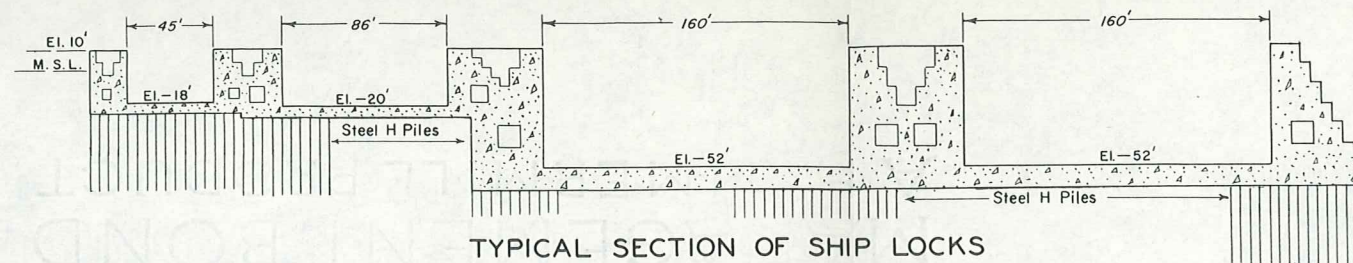




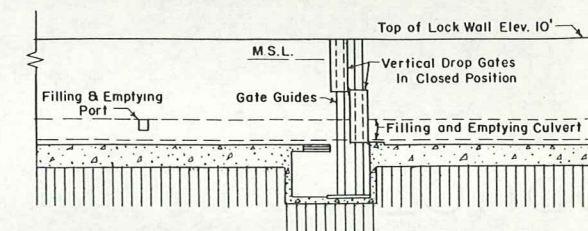
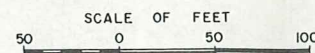
TYPICAL SECTION OF LOCK GATES



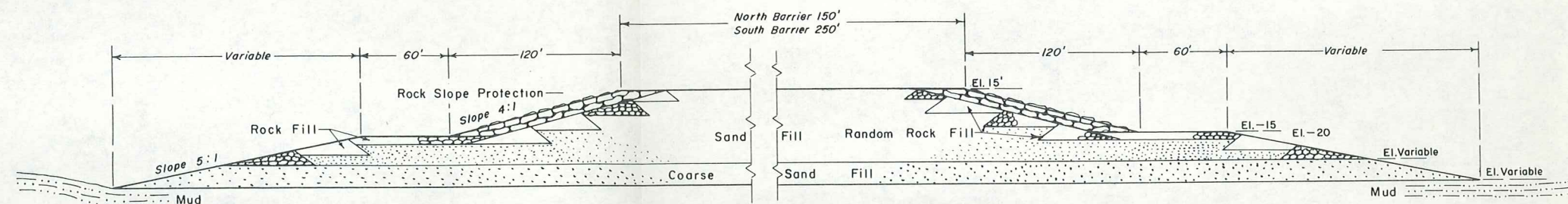
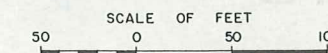
STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF WATER RESOURCES
SAN FRANCISCO BAY
SALINITY CONTROL BARRIER INVESTIGATION
LAYOUT OF REBER AND SAVAGE PLANS
SCALE AS SHOWN



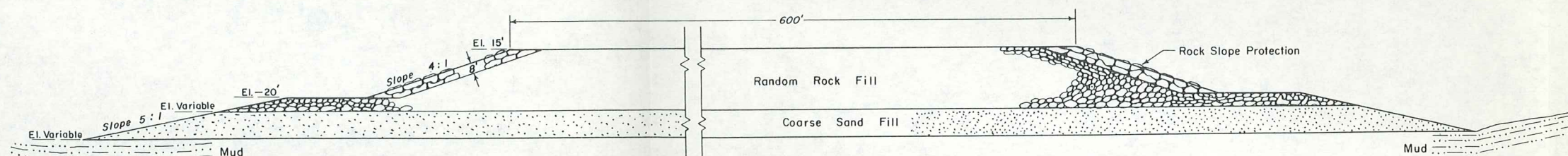
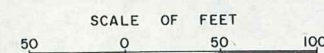
TYPICAL SECTION OF SHIP LOCKS
REBER AND SAVAGE PLANS



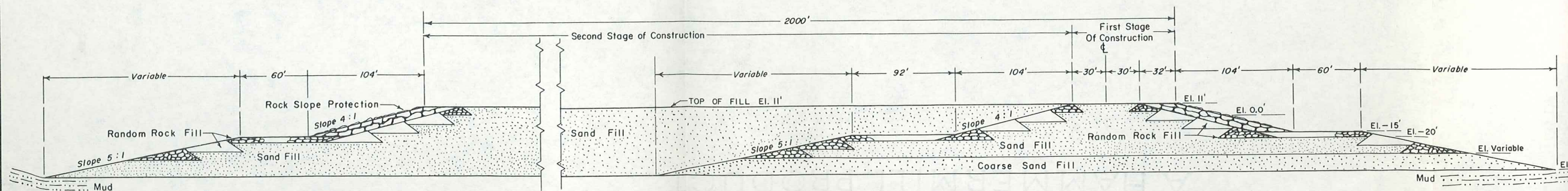
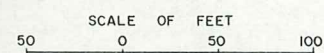
TYPICAL SECTION OF LOCK GATES



TYPICAL SECTION OF BARRIERS
NORTH AND SOUTH BARRIERS OF SAVAGE PLAN



TYPICAL SECTION OF BARRIER
NORTH BARRIER OF REBER PLAN



TYPICAL SECTION OF BARRIER
SOUTH BARRIER OF REBER PLAN

